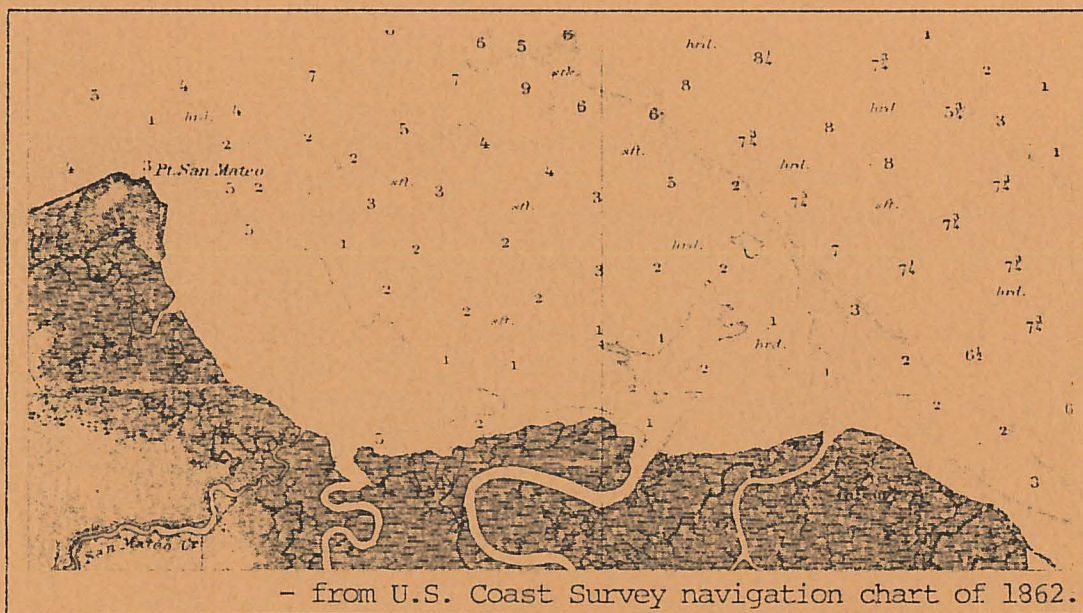


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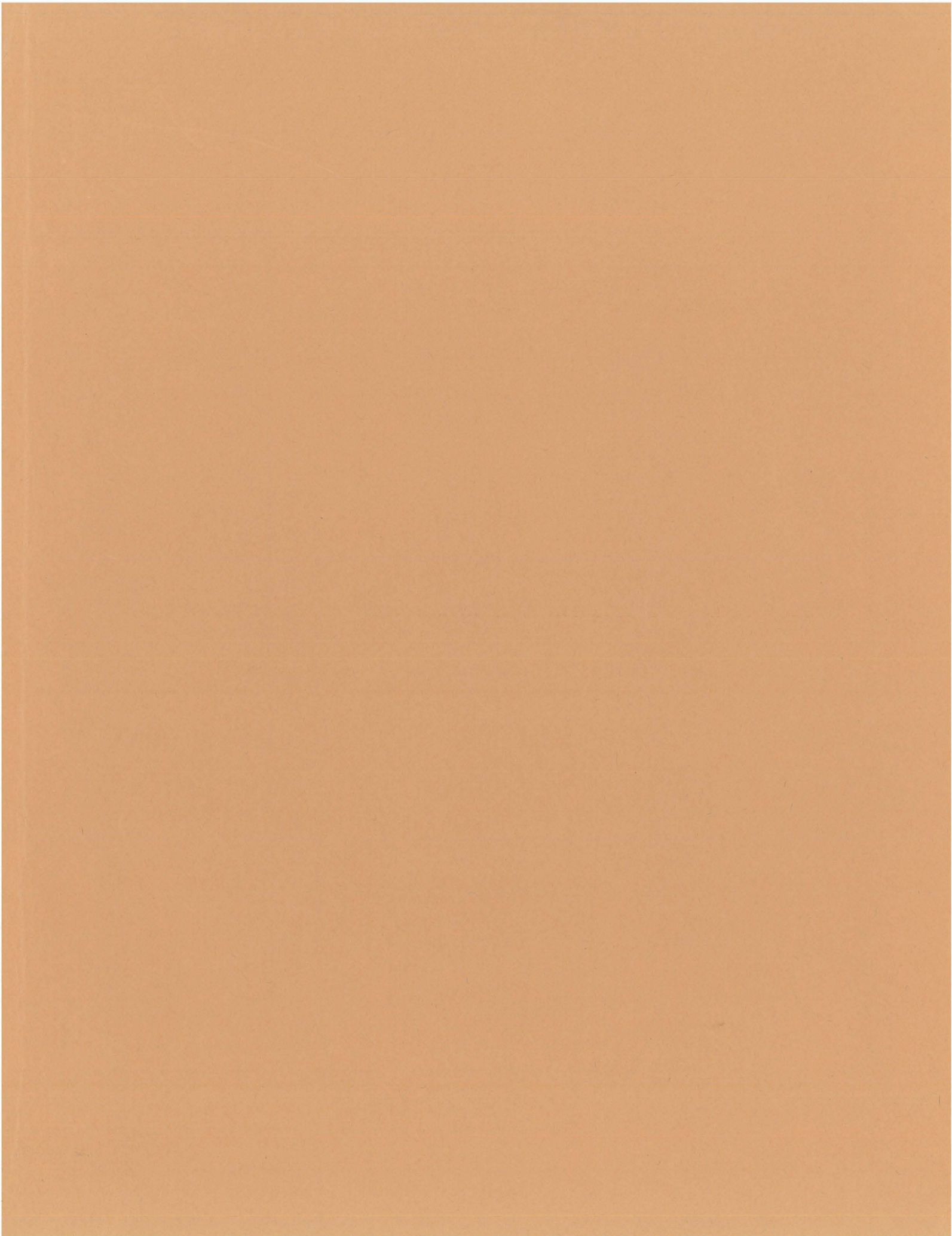
On Some Early Federal Surveys and Reports for South San Francisco Bay:

The San Mateo Bight



State Lands Commission
Title Settlements Section
1807 13th Street
Sacramento, CA 95814

10 MAR 1982



STATE LANDS COMMISSION

1807 13TH STREET

SACRAMENTO, CALIFORNIA 95814

(916) 445-2682



March 9, 1982

File Ref: W22904
Seal Slough Area -
Historic Conditions

San Francisco Maritime Museum
Foot of Polk Street
San Francisco, CA 94109

Attention: JUSTINE SCHULZ
Assistant Librarian

Dear Justine:

We enclose a copy of one of Dr. Dedrick's Reports which may be helpful to you in considering historic conditions in the South San Francisco Bay estuarine system. The Report is entitled:

On Some Early Federal Surveys and Reports for South
San Francisco Bay: The San Mateo Bight, November 1981.

Sincerely,

A handwritten signature in cursive script that reads "Walter Cook".

WALTER COOK
Staff Counsel

WC:bq
Enclosure

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W.O. # 22904

ON SOME EARLY FEDERAL SURVEYS AND REPORTS
FOR SOUTH SAN FRANCISCO BAY: THE SAN MATEO BIGHT

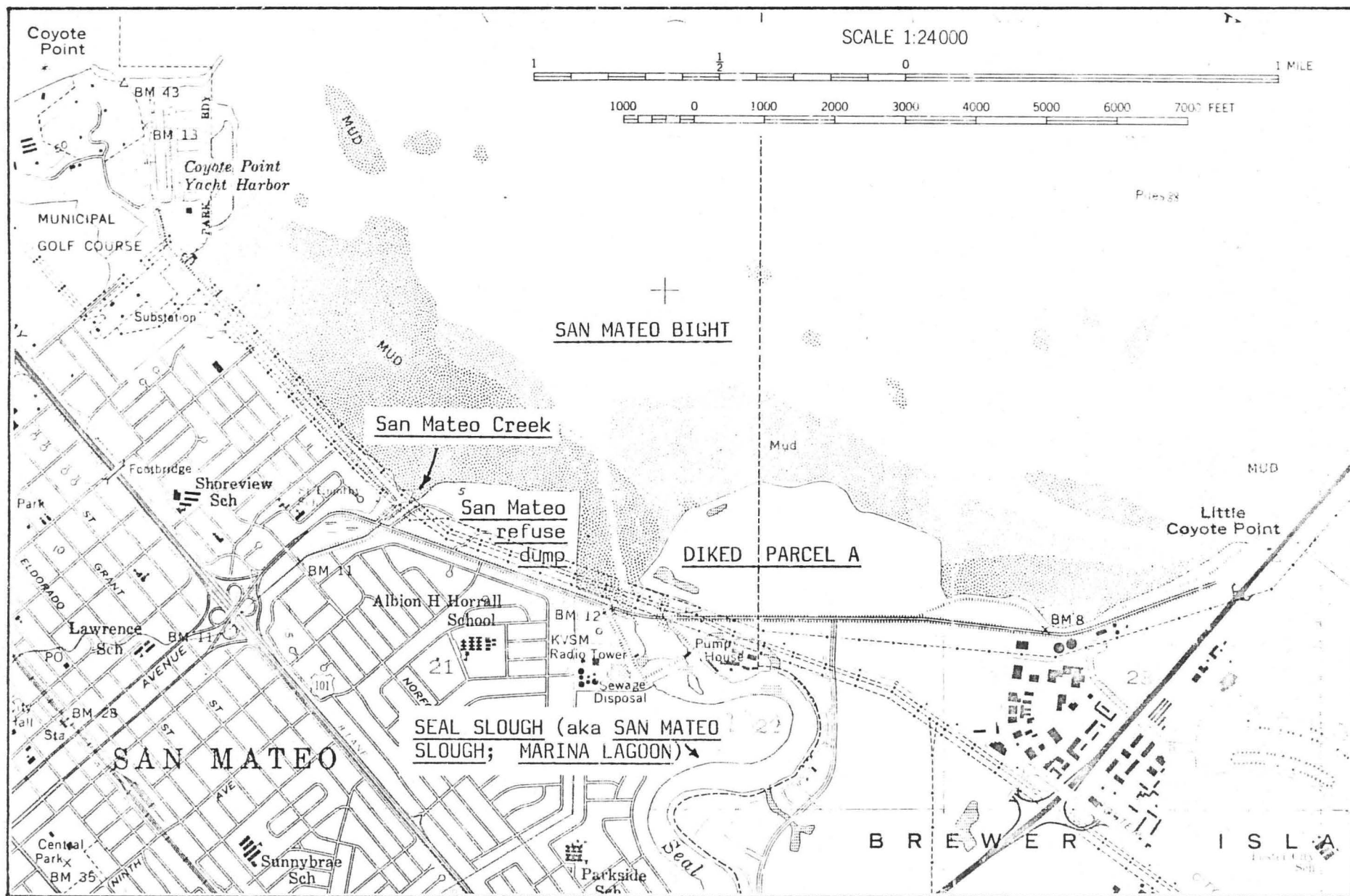
Prepared by:
Kent Dedrick

November 1981

ABSTRACT

The "San Mateo bight" consists of the area of south San Francisco Bay located between Coyote Point and the western terminus of the San Mateo-Hayward highway bridge, and lies partly within the city boundaries of Foster City and San Mateo. In this report, the history of topographic and hydrographic surveys of this area is related, along with a discussion of the natural and artificial changes that have taken place. Parts of this area were dredged, diked and filled pursuant to a 1961 permit issued by the U.S. Army Corps of Engineers; this permit and others in the general area are briefly described.

State Lands Commission
TITLE SETTLEMENTS SECTION
1807-13th Street
Sacramento, CA 95814



Adapted from U.S.G.S. Quadrangle map: SAN MATEO, CALIF., (photorevised 1980).

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1. Introduction

The purpose of this study is to collect and summarize some early Federal reports, surveys and actions dealing with the wetland area of south San Francisco Bay in San Mateo County that can be called the "San Mateo Bight", lying between Coyote Point and the western terminus of the San Mateo-Hayward highway bridge. In this area, San Mateo Slough (also known as "Seal Slough" and now as "Marina Lagoon") is a prominent feature. West and east of it are the San Mateo refuse dump and a 125-acre diked area, herein described as "diked parcel A" (see map, frontispiece). Many natural and artificial changes have occurred in the bight area and are documented in the source materials consulted.

All topographic and hydrographic surveys by the U.S. Coast & Geodetic Survey (USC&GS) and its predecessor the U.S. Coast Survey have been studied. The surveys were conducted in pairs, with the topography determined first and the hydrography second. For south San Francisco Bay, four pairs of surveys were performed in the 1850's, the 1890's, the 1930's, and the 1950's. Plain language Descriptive Reports are available except for the 1850's surveys and some of the 1890 hydrographic surveys.

The Descriptive Reports provide an interesting chronicle of changes in land use and improvements. The survey sheets themselves show that a major retreat of the bayward marshland margin occurred over the years, and also show changes in the channels of sloughs entering the bight. From the survey sheets, one can trace the history of the extensive diking that had taken place in nearby bay marshlands, extending from San Mateo in the west throughout Brewer Island to its northeast extremity. The most recent topographic survey of 1952 shows that "diked parcel A" was open water at that time.

Although Descriptive Reports for the 1850's USC&GS surveys are not available, the Report of the Superintendent of the Coast Survey (R. Sup.) for these years provides many details concerning the conduct of this work. In addition, the sounding data notebooks carried by the hydrographic parties give water depths and positions as well as tidal information in profusion. All such material as available has been studied that relates to the 1850's surveys; similar material has been consulted in relation to the 1890's work.

The Army Corps of Engineers has granted several permits for work in the Brewer Island area under authority of Section 10 of the 1899 River and Harbor Act.¹ One of these permits is for the construction of a "new dike" surrounding the area of "diked parcel A", but no other permits have been found that deal with this property. An inventory of Corps permits issued for work in the Brewer Island area is given below in Section 4.

The Corps of Engineers has often prepared reports for Congress dealing proposed navigation projects. Many such reports are available that deal with various parts of San Francisco Bay. One study of this kind was prepared in 1884 dealing with possible dredging or channel improvements of "San Mateo Creek", whose mouth is about 4,000 feet west of the western boundary of diked parcel A. No other early Corps reports have been found that deal with the Brewer Island-San Mateo area.

Several writers have noted changes in the bayward marshland margins of south San Francisco Bay. The renowned geologist, G.K. Gilbert (1917)* specifically noted the retreat of this marshland margin in the area of diked parcel A by comparing the USC&GS surveys of the 1850's with those of the 1890's. In his PhD. dissertation, Pestrong (1965) provided a map showing the area

1. 33 U.S.C. Sec. 403.

* All references are listed at the end of this report.

of Brewer Island and the San Mateo bight; this map shows that the retreat of the marshland margin at the San Mateo bight continued for many years. Nichols and Wright (1971) studied all of the earliest USC&GS topographic surveys of the entire San Francisco-San Pablo-Suisun Bay estuarine complex and published a series of maps showing how these early surveys compare with recently determined topography; the Nichols-Wright maps show both marshland margin advance and retreat. In a deposition Lopez (1973), former Chief Engineer for Leslie Salt Company, discussed areas of both advance and retreat of marshland margins in south San Francisco Bay, but made no comment on the area of the San Mateo bight.

Some USC&GS Descriptive Reports dealing with other parts of south San Francisco Bay provide interesting comments upon changes that have taken place in bay marshlands and the adjacent mud flat and shell bank area, although none points specifically to the area of diked parcel A. Selected comments from these reports are cited below because they provide information on the character of the natural physical processes at work that tend to result in advance or retreat of these bayward marshland margins.

In any discussion of California's tidal marshlands, it is important to keep in mind their geologic history as it is understood today [see Atwater et al (1977)]. The dominating factor in the development of these lands is believed to be the sea level rise following the melting of the most recent (Wisconsin) glaciers. Some 30,000 years ago when the glaciers had reached their maximum extent, sea level was some 400 feet below its present elevation. At that time, San Francisco Bay did not exist, and the shore of the Pacific Ocean was in the vicinity of the Farallon Islands.

Many recent studies for San Francisco Bay and other parts of the globe now provide more precise knowledge of the elevation of sea level during the

years following the Wisconsin glacial era. These figures indicate that the rising sea entered the Golden Gate only about 10,000 to 11,000 years ago, and at that time, sea level was rising at the rate of about 2 cm per year. It is believed that this rapid rate of flooding did not permit the establishment of extensive marshlands; marshland building through the deposition of new sediments in the then existing marsh tracts probably could not keep up with the rapid rate of sea level rise.

Later, the rate of sea level rise has slowed considerably, and has been about 0.1 to 0.2 cm per year over the last 6,000 years. It is believed that the broad margin of marshlands in San Francisco Bay known to have existed in the 1850's were created during this period of about 6,000 years, mainly through the deposition of sediments brought into the bay by both major streams and local minor creeks.

Evidence indicates that the bay had existed at times prior to the Wisconsin times, and that, for example, the bay basin was extensively flooded by ocean waters about 100,000 years ago. Undoubtedly, San Francisco Bay has existed at many other times as well, following the melting of ice after other known glacial eras.

Reports of research conducted mainly in Europe provide interesting details of the marshland building process. Such studies often deal with the rate of accumulation of sediments in terms of the elevation of the marsh relative to tidal datum planes. The deposition rate is generally high where the marsh area is flooded daily and not subject to excessive wave stress. As the marshland surface elevation builds up, due to this sediment accumulation, the area is flooded less frequently, thus slowing the rate of deposition of new material. Eventually the marsh elevation becomes sufficiently high to prevent further tidal flooding, and, at this time, further deposition of sediments does not noticeably occur.

The study of both geologic history and processes involved in marsh building are important to establish the estuarine origin of tidal marshlands. A contrary view occasionally encountered suggests that marshlands are part of the uplands, but there appears to be no sound scientific evidence that such is the case.

2. List of USC&GS Topographic and Hydrographic Surveys.

The following table identifies all topographic and hydrographic surveys covering the area of the San Mateo bight studied in this work. The earliest surveys (T-433 and H-628) were prepared by the U.S. Coast Survey; all others were prepared by its successors, the U.S. Coast & Geodetic Survey. Plain language Descriptive Reports are available as noted.

TABLE I

<u>Register No. §</u>	<u>Date</u>	<u>Scale</u>	<u>Descriptive Rpt.</u>
T-433	1853	10,000	No
T-2310	1897-98	10,000	Yes
T-4605	1930-31	10,000	Yes
T-4642	1931-32	10,000 (aerial base)	Yes
T-11069	1952	10,000 (aerial base)	Yes
H-628	1857-58	20,000	No*
H-2412	1898	10,000	No
H-5133	1931	10,000	Yes
H-8026	1954-56	10,000	Yes

§ Throughout this work, survey sheets and Descriptive Reports are identified by Register Number, and are distinguished as topographic by the prefix letter "T", or as hydrographic by the prefix letter "H".

* A one-page note dated September 21, 1931 is filed in USC&GS records relative to the datum of soundings of H-628 and four other early hydrographic sheets for San Francisco Bay.

3. Analysis of USC&GS Survey Maps, Descriptive Reports, and Related Documents.

a. Surveys of the 1850's

Prior to conducting the topographic and hydrographic work for San Francisco Bay, the U.S. Coast Survey first established a triangulation net for the area. According to various volumes of "Report of the Superintendent of the Coast Survey" (hereafter denoted by "R. Sup."), this triangulation work was planned and partially executed during 1851 (R. Sup. 1851; see Sketch J No. 9), while the 1852 report states that "The triangulation of San Francisco Bay, its approaches, and dependencies, has been nearly completed." (R. Sup. 1852; p. 49. See also Sketch J No. 2.)

In the 1853 report, it is noted that "A preliminary base has been measured at Pulgas" (R. Sup. 1853; p. 21), and the 1854 report states "the final corrected length" of the Pulgas Base "was found to be 10,512.06 metres, or about six miles and a half." (R. Sup. 1854; p. 78. See also Sketch J No. 5, which is identical to T-432.) The Pulgas Base extends from a point in the hills west of Redwood City to the area now known as East Palo Alto, and is depicted in T-432 (1853). It serves to calibrate the triangulation work in distance. Details of the method of measurement of the length of the Pulgas Base are given in R. Sup. 1854; p. 78.

Working hard on the heels of the triangulation party, the topographic survey group largely led by Augustus F. Rodgers reported in 1853 that "The topography of San Francisco bay proper has been completed, and that of adjacent bays is in progress" (R. Sup. 1853; p. 21.) In the 1854 report, it is stated "During the season Mr. Cutts reports that the topographical sheet embracing Guano Island and San Mateo was completed by Mr. C.M. Bache. . . ." (R. Sup. 1854; p. 82.) This latter sheet is T-433 (1853), and includes

the San Mateo bight. T-433 carries the barely legible handwritten note: "Survey by A.F. Rodgers, Sub-Asst.", however, a table showing final topographic work registered in the archives of the U.S. Coast Survey does not identify the topographer of T-433 (R. Sup. 1857; Appendix No. 23, p. 242). As noted above, this work was apparently most directly supervised by Mr. C.M. Bache.

Most of the remainder of the topographic sheets for south San Francisco Bay carry the date 1857, and according to the Superintendent's report for that year---

"Seven topographical sheets in all have been completed during the season, of which five contain in connection the shore-line, creeks, and water courses of the lower part of the bay. . ."

"Commencing at the Upper Contra Costa, the first sheet executed comprised, in addition to the eastern shore and numerous intricate streams, a survey of Union City. A second sheet reaches to the extremity of the bay, and includes the shores of Coyote creek and its tributaries; Ravenswood and Alvise (sic) are contained on the third sheet, with the shore-line and water courses occurring between those two towns. The work continued from Ravenswood upwards, along the western side of the bay, is comprised on the two sheets, one of which includes Redwood city and the shores of San Francisco bay to Guano Island.

"The marginal shore-line of the bay within the limits just described is much broken by small creeks and more considerable streams, all of which are represented in the details of the topography."

(R. Sup. 1857; p. 111)

T-433 (1853) "Point San Matheo (sic) to Guano Island"

This sheet shows both the bayward and landward margins of San Francisco Bay marshlands in the area covered. The Marsh area is shown heavily cut up by both large and small tidal creeks. The San Mateo bight is included on this sheet. Besides the "Guano Isd." triangulation station, the sheet shows only six man-made structures in the baylands. One of these appears to be an unimproved road leading easterly along the north bank of "San Matheo (sic) Cr." a few hundred feet into the marshlands and terminating on the shore of the creek,

where an embarcadero is later known to have been located (see below). The other five improvements appear to be fences carried from the uplands into the marshlands.

In order to establish confidence in the accuracy of T-433, we have compared the topography of tidal creeks in this sheet with that shown in T-4642 (1931-32), which is based upon aerial photographs taken nearly 80 years later. By 1932, much of the marshland area had been diked between the Guano Island triangulation point and fast lands to the south and west. Except for the two major sloughs traversing this area (San Mateo Slough and Angelo Slough), most of the medium to small sized sloughs had been enclosed by the dikes, thus preserving them from modification by erosion and sediment deposition processes associated with tidal action.

The comparison shows that most of the medium sized sloughs shown on T-433 also appear on T-4642. By viewing the two sheets over a light table, it is seen that the locations, widths, and courses are in good agreement. For some of the smaller sloughs shown on both sheets, some differences are apparent, however.

On the basis of this comparison, we conclude that the topography of interior tidal creeks was faithfully represented by the 1853 survey sheet T-433.*

An independent check on the bayward marshland margin in the area of the San Mateo bight is available from both the associated hydrographic sheet H-628 and from the field notebooks of the sounding parties whose task was the measurement of water depths in the area during 1857 and 1858.

These soundings notebooks give the locations of the ends of traverses made by each of three sounding party boats in terms of simultaneous sextant bearings taken between three or more known landmarks. The boat Shark performed the work near the San Mateo bight. Where the end of a sounding traverse line is

* See, however, the discussion below re T-2310 (1897-98).

indicated on H-628 as being at the bayward edge of the marsh, it is a simple matter to verify this indication by replotting these positions on a copy of H-628 using a three-arm protractor set to the measured angles given in the soundings notebooks. The track of the Shark is on Figures 1 and 4.

Proceeding in this manner in the area between the "San Mateo" (Coyote Point) and "Guano Island" triangulation stations, we have determined that the sounding party in the Shark reached the bayward marsh margin a total of nine times (twice on April 7, 1857, and seven times on January 12, 1858). Two of these soundings traverse line endpoints fall within or nearly within the diked parcel A. Additionally, several other endpoint checks made southerly from the Guano Island station show these points to be along the bayward edge of the marshland as shown on H-628.

The soundings notebooks also give notations such as "at shore" or "aground" that are helpful in verifying the geographical character of the endpoints of the sounding traverse lines. Many such notations appear in the notebooks relating to endpoints between the San Mateo and Guano Island stations.

From our study of the 1857-58 soundings field notebooks and the associated hydrographic sheet H-628, we conclude that the bayward edge of the marshland as determined at discrete points by the hydrographic parties agrees with the marshland margin obtained in the topographic survey of 1853 as depicted in T-433.

The foregoing method has been suggested previously (Shalowitz Vol. 2, 1964, pp. 233-4) as "an independent check on the accuracy of the shoreline as surveyed by the topographer because the (sounding) boat's position is determined by a different method, namely, by angles to objects that are often on the opposite shore" (emphasis added). Indeed, the topographic sheets were prepared using the plane table method rather than by sextant bearings.

This remark by Shalowitz suggests that this "independent check" is useful in the field at the time of the survey, and, taken literally, presumes

that if any corrections to the topographic sheet were needed, they would have been carried out at that time. By making our own independent check today, we make no such presumption, and prefer to analyze afresh the basic field data in the soundings notebooks and both topographic and hydrographic sheets.

Topographic surveys for most of the remainder of south San Francisco Bay are dated 1857, and include a table of figures giving the area surveyed, as well as the miles of creeks, ponds, roads, and shoreline. In the case of T-433, this information is given as a handwritten note which appears to state:

5 $\frac{1}{2}$	miles of Bay Shore
114	" Shore of Creeks, etc.
5 $\frac{1}{2}$	" Roads
125	

C.J. (?)

Area 9 Sq. Miles.

Another handwritten note on T-433 also gives some survey statistics, but is so illegible that we cannot cite its contents with any degree of certainty.

H-628 (1857-8) "Hydrography of San Francisco Bay, Sheet No. VIII"

This large sheet covers a sizeable fraction of south San Francisco Bay. It is printed in two parts, each at scale 1/20,000, and covers the area from Point Avisidera (sic) in San Francisco to Coyote Hill Creek in Alameda County. The San Mateo bight is shown on both sheets.

Because of the importance of H-638 in the history of the general area, we provide here the chronology of the hydrographic work that was performed in South San Francisco Bay during the mid to late 1850's. Specific details of the hydrographic work for H-628 in the vicinity of the San Mateo bight are also provided.

A table of sounding boat work given on H-628 as well as the soundings notebooks themselves show that three sounding parties in the boats Gig, Shark, and Kate Hayes commenced work on the sheet on March 17, 1857 and terminated on May 15. The work was resumed on December 10, 1857 and carried on until January 20, 1858.

Several entries in the annual Report of the Superintendent of the Coast Survey refer to the south bay hydrographic surveys of the era, which include H-628, H-629, H-636, H-637, and H-638. The 1854 report noted that "The shore-line, from Point Avisidera, San Francisco Bay, towards Point (San) Mateo, was determined and furnished to Lieut. Comg. Alden, for the use of the hydrographic party; and subsequently Plane-table Sheet No. 16 was finished between the two points just named." (R. Sup. 1854; p. 81.) This report also notes that "Some (hydrographic) work has also been done near Point Avisidera, and between that and Point (San) Bruno" under Lieut. Comg. Alden (p. 83), which likely became the sheet H-421 (1854).

The 1855 report stated "Lieut. Comg. James Alden, U.S.N., assistant in the Coast Survey, in the steamer Active, has been engaged in the hydrography in these sections, assisted during part of the season by Lieut Comg. T.H. Stevens, U.S.N., and during the remainder by Lieut. Comg. Archibald MacRae, in the schooner Ewing." (R. Sup. 1855; p. 96.)

1856 was a year of difficulties, and the report of that year stated the hydrographic work was "interrupted during part of the past year by the use made of the steamer Active, under Commander Alden, in the Indian war in Washington Territory" (R. Sup. 1856; p. 83). Lieut. Comg. MacRae was lost to the hydrographic party, and the writer of the report grieved over "the untimely death of that intellegent and energetic officer" (Ibid; p. 84). Because of Alden's absence and MacRae's death, "devolved the completion of this duty upon Lieut. Comg. Cuyler."

According to the 1857 Report of the Superintendent, "The southern part of the bay, which remained at the close of the last season, has been sounded by the hydrographic party in charge of Commander James Alden, United States navy, in the steamer Active and schooner Ewing" and that "The greater parts of the months of March, April, and May were spent in this work." (R. Sup.

1857; p. 113.) The report also notes that at summer's end, Alden went to the Atlantic coast on leave, and Lieutenant Cuyler, "his experienced senior assistant" took command.

The 1858 Report stated that Cuyler "then took up and prosecuted the supplementary hydrography of the southeastern part of San Francisco bay below San Antonio creek, filling with soundings the unfinished parts of three sheets projected to include the whole of the bay below Point Avisidera." (R. Sup. 1858; pp. 113-114.) This task is reported to have involved 676 miles run in sounding, the determination of 2,097 angles, and taking 20,496 soundings, and the report stated "The supplementary work just referred to occupied the party until the middle of February" (p. 114). The Report noted that "Six original sheets, concluding the hydrographic survey of San Francisco bay and its dependencies, have been received within the year from Lieut. Comg. Cuyler, and registered in the office." (p. 114.) Registry of H-628 and H-629 in the archives of the Coast Survey was noted Appendix No. 24 of the 1857 Report, which was printed the following year. Other south San Francisco Bay hydrographic surveys similarly registered were noted in Appendix No. 19 of the 1859 Report, and include H-636, H-637, and H-638.

We now turn to specific details of the hydrographic work for H-628 in the vicinity of the San Mateo bight. The mouth of San Mateo Slough was surveyed on April 7, 1857 by the party in the boat Shark under command of Lieut. S. S. Bassett shortly after noon on a falling tide, according to soundings book No. 8. The tract of the Shark during this work is shown here on Figure 1 which provides the page number of book No. 8, corresponding to particular lines of soundings.

The tide reducers (which must be subtracted from measured water depths to obtain water depths relative to the survey tidal datum) have been abstracted from soundings book Nos. 7, 8, and 9 for the date April 7, 1857, and are given

here as Table II, and are plotted on Figure 2. It is readily seen from this Figure that the values for the reducers for all three boats in operation on that day are consistent, and to this extent can be relied upon to provide a satisfactory basis for the reduction of the sounding data on this date.

Soundings book No. 8 notes that the boat Shark was "near shore" at the west bank of San Mateo Slough at angle point No. 14 (see Figure 1). A line of soundings was then taken across the slough, and the soundings book entries note "end of line" once across it at angle point No. 15. Angles were observed for three-point fixes before and after crossing the slough, and we have verified by plotting on a copy of H-628 that the fixes are located at the bayward edge of the marsh on either bank of the mouth of the slough. The soundings taken in crossing the slough are shown plotted in Figure 3, and the distance scale for this Figure was obtained by calculating the positions on angle point Nos. 14 and 15 from three-point fix data and then evaluating the distance between these two points.

An overlay comparison of maps indicates that the mouth of the slough as shown on T-433 (1853) lies just bayward of the northeast corner of the diked parcel A as shown on the San Mateo/U.S. Geological Survey quadrangle map as photorevised in 1968.

The marshland margin between Point San Mateo and Guano Island was visited again on January 12, 1858 by a sounding party in the boat Shark under the command of Lieut. P.C. Johnson. The track of the Shark for this day is shown on Figure 4, while the tide reducers are given in Table II and plotted in Figure 5. These exhibits are based upon information given in soundings book No. 15, for Shark, and No. 16 for Kate Hayes.

Entries in book No. 15 show that at about 9:40 a.m., the Shark reached an area near the east bank of a large un-named slough lying about 1000 feet east of the mouth of San Mateo Creek (not to be confused with San Mateo Slough)

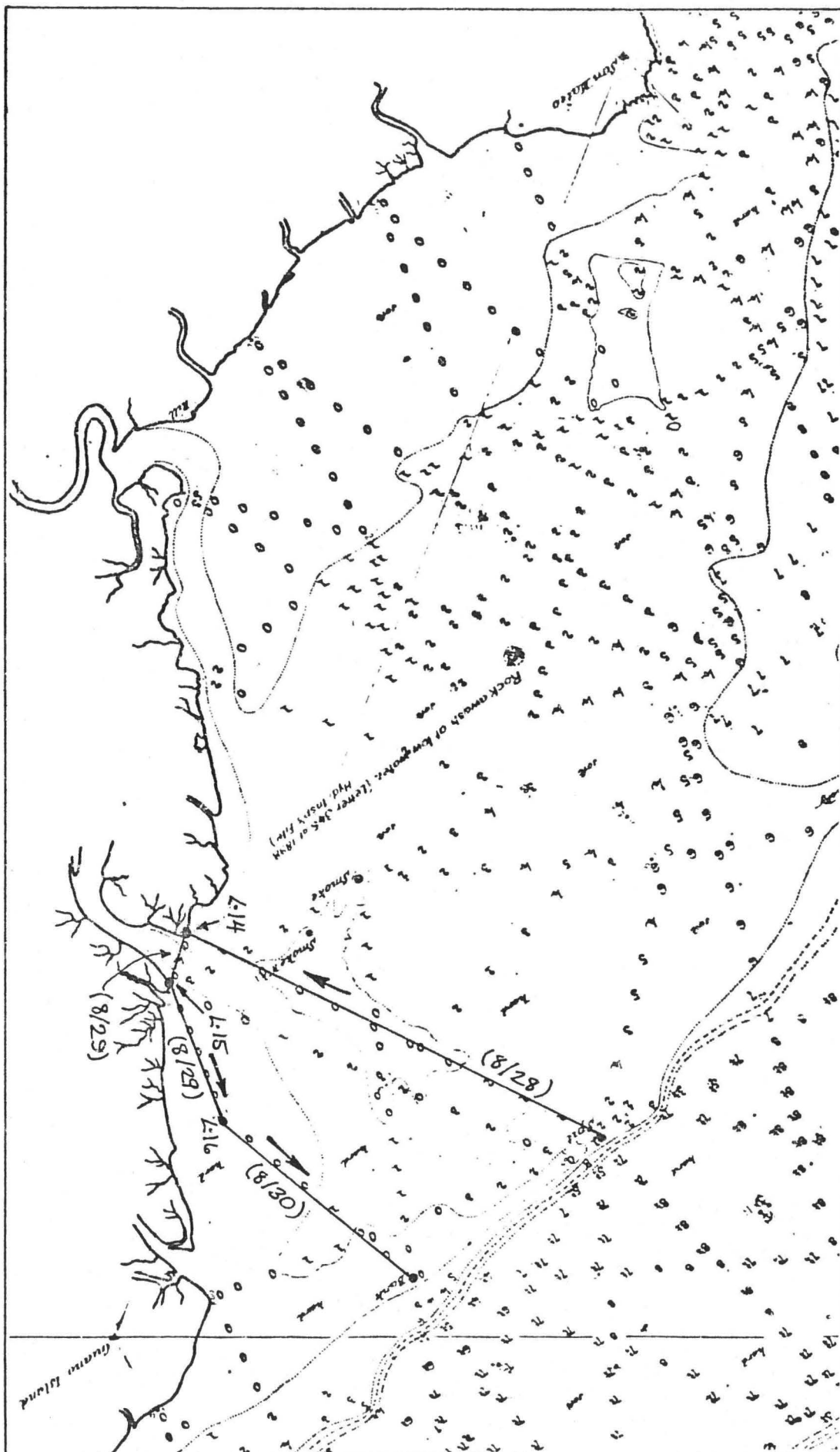


FIGURE 1. Partial track of the sounding boat Shark on April 7, 1857 in the vicinity of the San Mateo light, San Francisco Bay. Adapted from the U.S. Coast Survey sheet H-628.

TABLE II:

TIDE REDUCERS AS GIVEN
IN SOUNDING NOTEBOOKS
(Reducers in feet)April 7, 1857GIG
(Book 7)
Time Reducer

8:45 AM	5.2
9:00	5.5
9:30	5.9
10:00	6.4
10:15	6.6
10:45	6.9
11:00	6.9
11:05	6.9
11:30	6.9
11:35	6.9
12:00	6.7
12:55 PM	5.9
1:00	5.9
1:30	5.3
1:40	4.9

SHARK
(Book 8)
Time Reducer

7:32 AM	3.5
7:48	3.9
8:00	4.2
8:05	4.2
8:15	4.5
8:32	4.9
8:48	5.2
9:30	5.9
9:46	6.2
9:55	6.3
10:05	6.4
10:16	6.6
10:17	6.6
10:48	6.9
11:00	6.9
11:15	6.9
11:37	6.9
11:46	6.8
12:00	6.7
12:16 PM	6.6
12:26	6.4
12:41	6.2
1:00	5.9
1:10	5.6
1:29	5.3

KATE HAYES
(Book 9)
Time Reducer

7:30 AM	3.5
7:50	4.0
8:13	4.5
---	4.6
8:34	4.9
9:00	5.5
9:14	5.8
9:28	5.9
10:00	5.4
10:13	6.6
10:33	6.8
11:00	6.9
11:13	6.9
11:26	6.9
12:50 PM	6.2
1:55	4.6
2:00	4.6
2:25	3.8
2:45	3.4
3:00	3.1
3:27	2.4

January 12, 1858GIG
(Book 17)
Time Reducer(No record for
Gig this date)SHARK
(Book 15)
Time Reducer

8:05 AM	6.0
8:30	6.2
9:00	6.5
9:30	6.67
9:50	6.67
10:00	6.62
10:21	6.47
10:30	6.37
10:45	6.26
11:00	5.95
11:15	5.78
11:30	5.43
12:15 PM	4.56
12:30	4.04
12:40	3.76
1:00	3.22
1:06	2.98

KATE HAYES
(Book 16)
Time Reducer

8:20 AM	6.12
8:35	6.20
8:52	6.42
9:10	6.58
9:25	6.63
9:42	6.67
10:04	6.62
10:22	6.49
10:30	6.37
10:45	6.26
11:00	5.95
11:25	5.61
11:40	5.23
11:48	5.02
12:12 PM	4.56
12:23	4.31
12:37	3.76
12:55	3.48
1:02	3.22

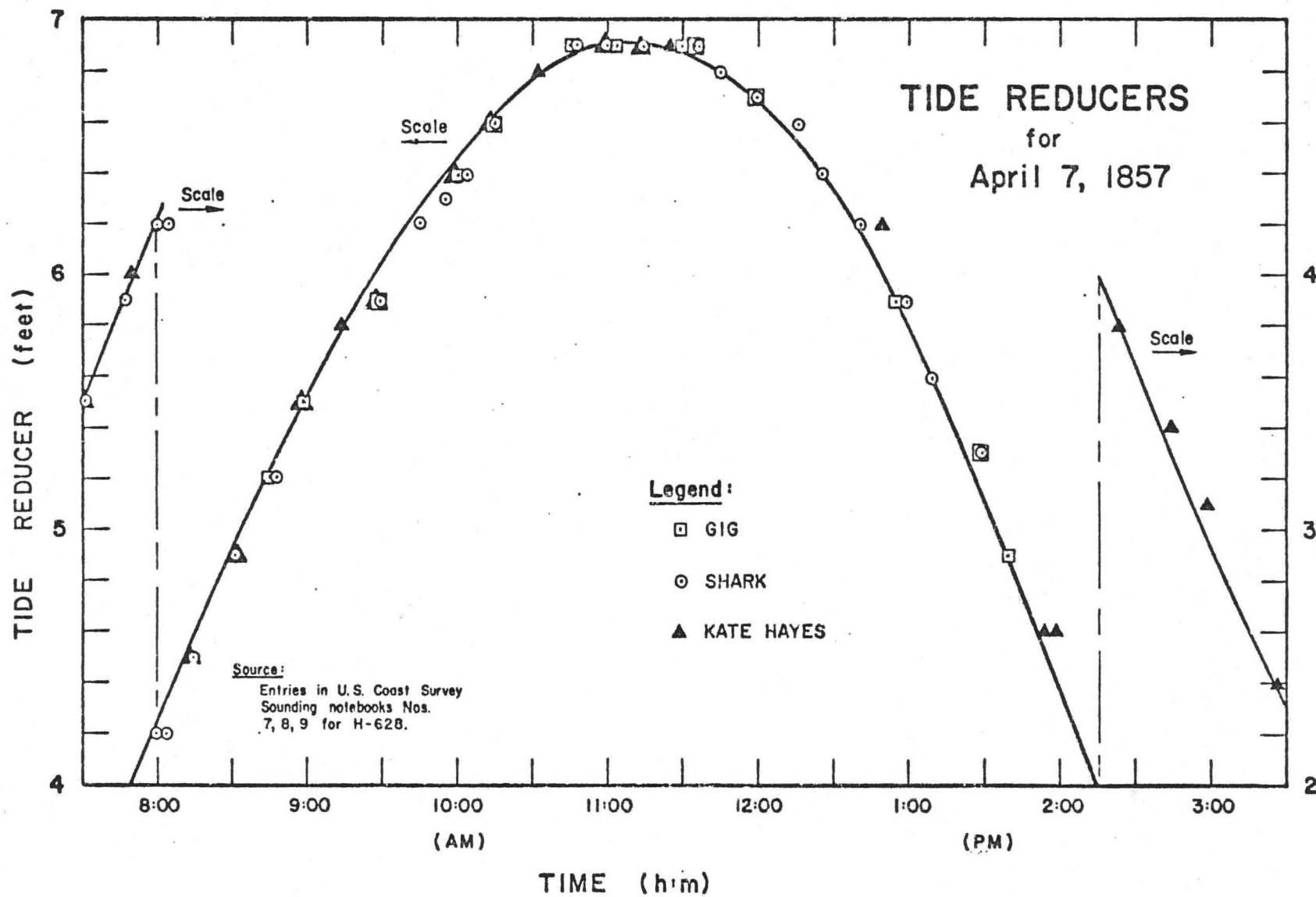


FIGURE 2

82-040

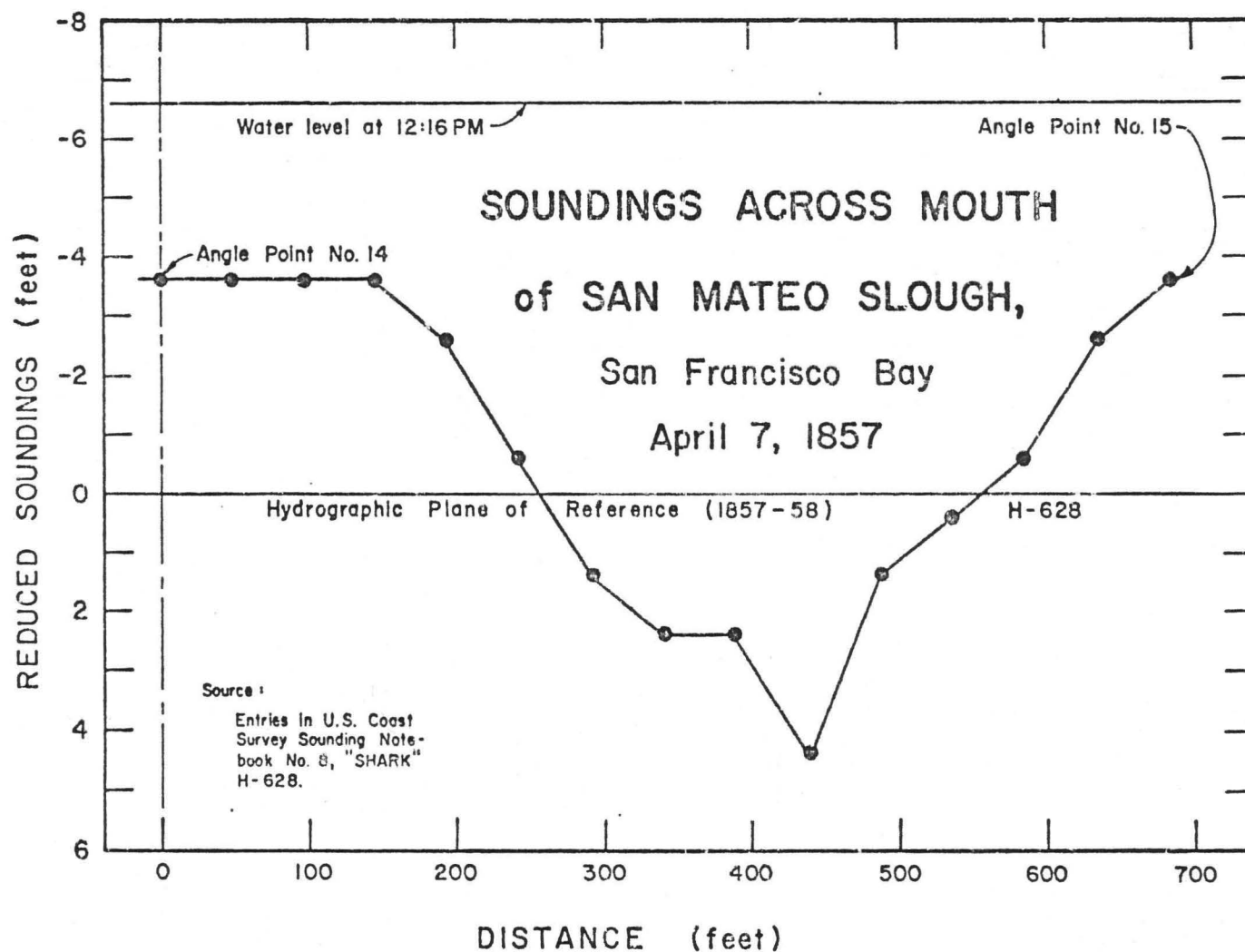


FIGURE 3

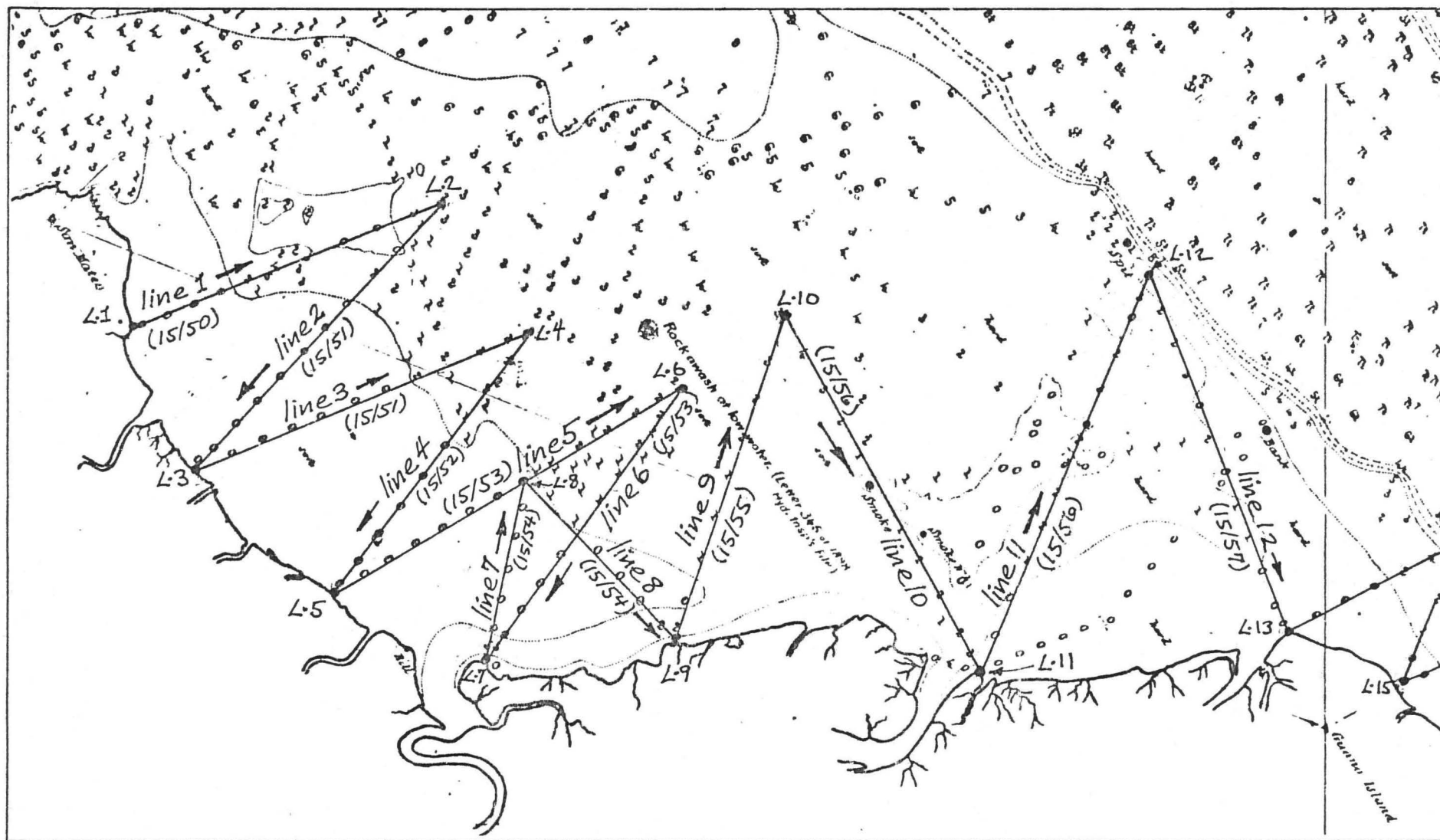


FIGURE 4. Partial track of the sounding boat Shark on Jan. 12, 1858 in the vicinity of the San Mateo light, San Francisco Bay. Adapted from the U.S. Coast Survey sheet H-628.

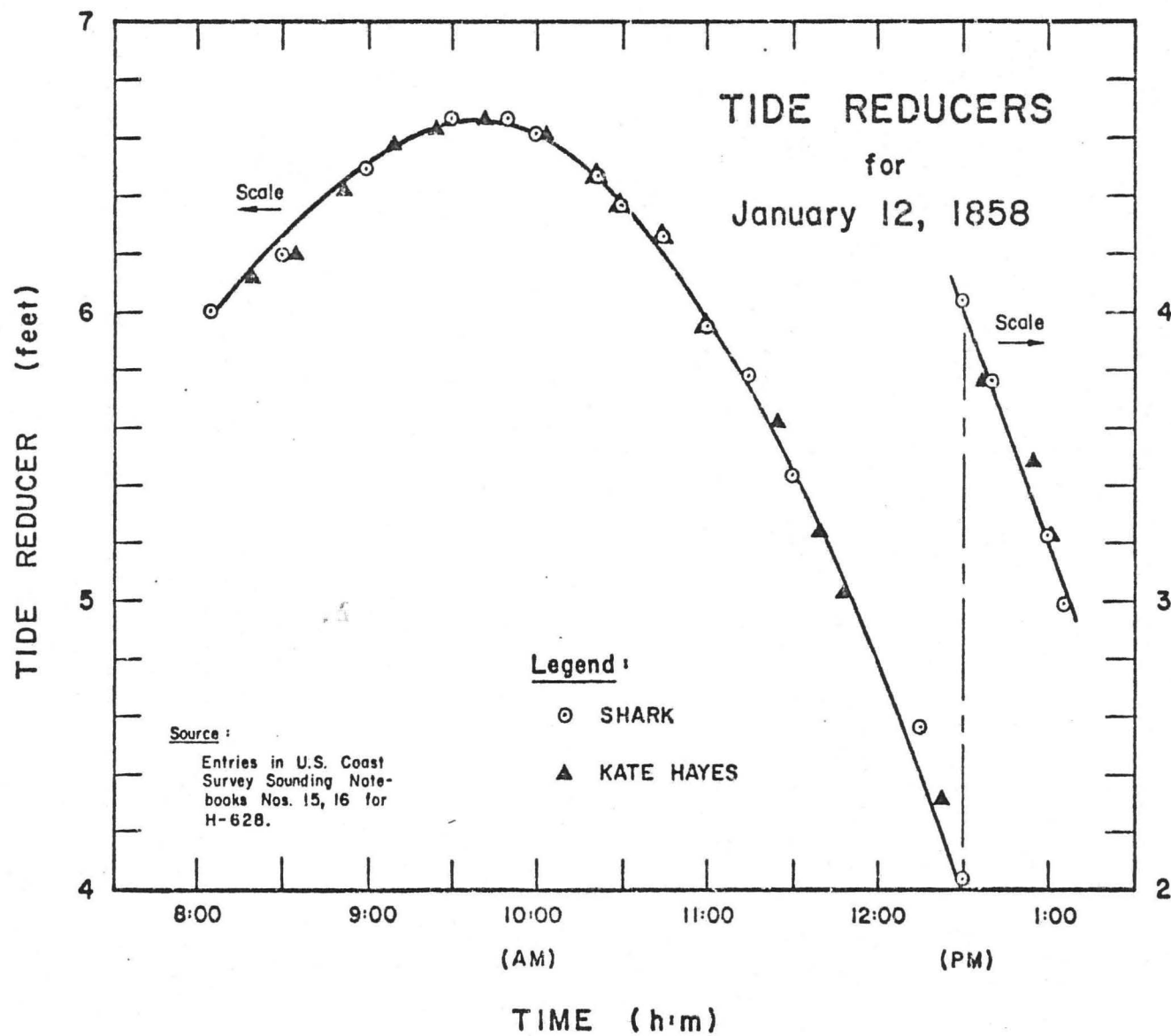


FIGURE 5

as it existed in the 1850's. At this point (angle point No. 7), the sounding book has the entry "at shore" and provides a 3-point fix, which we have plotted anew and found it to be on the marshland margin given on H-628. Comparison with U.S.G.S. San Mateo quadrangle shows this point to lie at about the center of the present refuse dump operated by the City of San Mateo.

After sounding a leg offshore, the Shark returned to the marsh margin at about 10:10 a.m. The sounding book notes "(at shore) End", and that a 3-point fix was taken (angle point No. 9). Again, we find that plotting the fix places the boat at the marsh margin as given on H-628. Comparison with the U.S.G.S. San Mateo Quadrangle shows this point to be very near to the north-westerly corner of diked parcel A.

After sounding another leg offshore, the Shark arrived at the marsh margin shortly after 10:45 a.m. at very nearly the same point on the easterly bank of the mouth of San Mateo Slough as visited on April 7, 1857. An entry in the sounding book states "(at shore) End", and a 3-point fix is recorded (angle point No. 11). By plotting this fix, we find the point to be at the marsh margin given on H-628. As noted above, we have determined that this point lies just bayward of the northeast corner of the diked parcel A as given on the U.S.G.S. San Mateo quadrangle map as photorevised in 1968.

The above-noted locations where the sounding boat approached the marsh margin are the only ones reported in H-628 that lie at or near the diked parcel A.

The hydrographic sheet H-628 shows that the mouth of San Mateo Slough was located some 3,000 feet easterly of its main mouth as seen in later surveys. H-628 shows also that the un-named slough west of San Mateo Slough had a significant channel bayward of but paralleling the marsh margin east of its mouth. No well-defined channel leading from the mouth of San Mateo Slough bayward of the marsh margin is noted in H-628, nor is one suggested by the values of water depths recorded in the soundings books for the area.

In 1931, the chief of the Division of Tides and Currents for the U.S. Coast and Geodetic Survey noted in a letter that "The reducers for Hydrographic Sheets Nos. 421, 628, 629, and 636 appear to be referred to the plane of mean lower low water within the allowable error of 0.3 foot." The letter noted that "Since the datums used in these old surveys have not been preserved through bench marks, the exact relations between the old planes and the planes in use today cannot be determined." Because of this, reported depths given on H-628 relative to the MLLW datum may include an uncertain error; however, there is no reason to doubt the correctness of the relative depths reported on this sheet. [Note: Values of MLLW on tide staffs have been revised (10/81)].

b. Surveys of the 1890's

Between 1894 and 1900, some 11 topographic and 8 hydrographic survey sheets of south San Francisco Bay were prepared by the U.S. Coast and Geodetic Survey. The south bay work was but a part of a more ambitious undertaking, namely, a complete resurvey of the entire San Francisco Bay estuarine complex and its shorelines. This effort commenced while George Davidson was in charge of the San Francisco suboffice of the U.S.C.&G.S., but was completed when the suboffice was managed by Augustus F. Rodgers. The administrative and narrative details of this surveying task for the south bay are given in a separate report by the author [Dedrick (1977)].

T-2310 (1897-98) "Resurvey of San Francisco Bay, California, San Mateo to San Carlos"

A Descriptive Report is available for T-2310, which, together with material given in by Dedrick (1977), provides detailed documentation of the area. The work was conducted by Ferdinard Westdahl under the direction of Augustus F. Rodgers. The handwritten Descriptive Report bears Westdahl's signature, in addition to a forwarding note signed by Rodgers.

Excerpts from the Descriptive Report for T-2310:

- (page 1) "This is a re-survey entirely of the area covered with solid land, but only in part of the marsh lands."
- (pages 4,5) "On the marsh lands the shore-line and principal sloughs have been re-surveyed, and all improvements, such as oyster beds, houses, dykes, etc. existing there. Where a change in the small sloughs had taken place, such as a new connection with another slough or the closing of a former boat passage, it was surveyed if known or suspected, but all minor changes could not be noted without going over the entire area. Generally the flats at the headwaters of the sloughs are being gradually contracted by the growth of marsh grass. The boundary line between marsh and the dry land is in many places illy defined, caused principally by the tramping of grazing cattle. The dykes built over the marsh lands are generally ineffective owing to the imperfect damming of small sloughs crossed by them. These dams have nearly all washed out and the ditches created by the building of the dykes have assisted in forming new connections between sloughs. After the high tides prevailing in winter months as soon as the marshes are uncovered a very swift current runs through these small sloughs and ditches. They are consequently deep though not wide. The area westward of Hayward's Landing, now abandoned because of the filling up of the slough leading to the bay, is enclosed by the only effective dyke within the limits of the sheet. The old sloughs within this dyke still exist and contain water, but it stands at a lower level than that of the adjacent sloughs and is gradually being freshened by winter rains. The marsh land within is solidifying

and sinking below the level of the surrounding marsh in a natural state. It is first utilized for grazing cattle and soon becomes fit for cultivation. I have been informed that such reclaimed land is very productive."

This survey was performed using the plane table, but in addition, a levelling instrument was used to establish contours. The Descriptive Report gives no references to any details of positions of triangulation points or other signals. However, the latitude and longitude coordinates of the Angelo station are given on the sheet itself (see below).

Remarks concerning the sheet T-2310.

This sheet shows that many artificial changes in the baylands from San Mateo and Belmont to San Carlos had taken place since the 1853 survey given by T-433. Except for the diked area of approximately 380 acres in the vicinity of Hayward's Landing lying south of San Mateo Creek*, the vast marshlands shown on the sheet remain essentially in a natural state. The sheet indicates that approximately three miles of additional dikes had been constructed roughly along the historic landward boundary of the marshlands.

Hayward's Landing is shown as remaining in contact with the open bay, although the Descriptive Report states it had been "abandoned because of the filling up of the slough leading to the bay." On T-2310, the mouth of the slough is certainly less than 300 feet wide, constricting quickly to about 125 feet; whereas the 1853 sheet T-433 shows the mouth to be over 600 feet wide, and constricting to slightly less than 200 feet at about 1,000 feet landward.

At Belmont, a road leading bayward (northeasterly) from this small town appears to serve two different waterfront landings on adjacent sloughs. One of these is marked "Bath Ho " on the sheet.

* The area northerly of San Mateo Creek is also shown as enclosed by dikes.

The statement in the Descriptive Report that "generally the flats at the headwaters of the sloughs are being contracted by the growth of marsh grass" is supported by comparing this sheet with T-433, particularly in the marshland areas near the landward marshland margin.

The Guano Island triangulation station is shown on the sheet with the additional notation: "Little Coyote". About 1,000 feet northerly from this point in open waters is the "San Mateo Oyster Ho. M.O. Co.", at about 150 feet from the bayward marshland margin. Surrounding the open water area nearby is shown the "Morgan Oyster Company Oyster Bed" surrounded by a dashed line on the sheet, which represents a fence. Such fences are discussed in Descriptive Reports for topographic sheets concerning other parts of south San Francisco Bay that were conducted at the same time, namely, the late 1890's.

For example, the Descriptive Report for T-2258 (1896) ("Dumbarton Point to Head of Bay") describes the fences as consisting "of round poles about three inches in diameter driven into the bottom as closely as possible in order to exclude stingrays and other predatory fishes and seals from the oyster beds." The Descriptive Report for T-2311 (1897) ("San Carlos to Menlo Park") states that the fences were constructed "of split redwood three to four inches in diameter driven into the bottom about six or eight inches apart . . .".

Returning now to the subject sheet, T-2310, another oyster bed is shown, namely, "Moraghan's Oyster Bed" that is located in open bay waters near Coyote Point. A few hundred feet northeasterly of this oyster bed is the location shown on the sheet for "Moraghan's Oyster Ho.". Finally, the sheet shows a "Line of Stakes" in bay waters just northerly of the diked parcel A.

San Mateo Creek as shown on the 1853 sheet we estimate to have been some

65 feet wide as it passed through the marshlands. However, on T-2310, San Mateo Creek appears to be approximately 15 feet wide in the same reach through the marshlands. At the time of the latter survey, the marshlands on both sides of the creek had been enclosed by dikes, thus substantially reducing the tidal prism of the creek. According to an 1884 survey of the creek by the Corps of Engineers*, "a number of years" earlier, the creek had been dammed at its mouth "to compel the freshet waters to spread over and deposit their silt upon the adjoining marsh." This was said "to have been successful in raising and reclaiming the marsh, but necessarily at the sacrifice of whatever navigable value the creek may have possessed". The dam was still in place in 1884, but no trace of it is shown on the 1897-98 sheet T-2310.

According to this Corps report, "the adjoining land is marsh, standing at the level of ordinary high water and a foot or two below the level of spring tides."

H-2412 (1898) "San Francisco Bay, San Mateo Cr. to Redwood City Creek, California."

No Descriptive Report is available for this hydrographic sheet, nor for other south bay sheets (H-2411, H-2413, H-2414, H-2415) prepared during the latter half of 1898. A search at both the National Ocean Survey and U.S. Navy archives has failed to produce either the reports or information suggesting the events leading to the message on file concerning these sheets: "Impossible to prepare rept. Data lost 15 Je 1900."

As pointed out in Report 77-1, work on all five sheets commenced in 1898 shortly after the explosion on the U.S. battleship Maine at Havana precipitated war with Spain. As a result, the steamers Patterson, Gedney, and McArthur

* "Preliminary Examination of San Mateo River (sic), California", Ann. Rpt. Chief of Engineers, 1885. House Ex. Doc. 1, pt. 2, Vol. II. (49th Congress, 1st Session), pp. 2342-2343.

which were involved in west coast hydrographic work and operating out of San Francisco were held in readiness for the war effort at least from April 1898, and all U.S. Navy officers attached to these vessels and the U.S.C. & G.S. were recalled for Navy duty in connection with the War. Under the command of Assistant E.F. Dickens, the McArthur returned to service in south bay hydrographic surveying work on October 10, 1898, which was toward the end of the work on the five sheets.

Dickens was in charge of all five hydrographic surveys noted, and the first of these was H-2412, which covers the area of the San Mateo bight. The hydrographic field work for this sheet was carried out from May 26 to Sept. 2, 1898 using a dinghy. According to notations on the sheet, thirteen volumes of soundings notebooks are reported to be associated with H-2412, but we have not had the opportunity to see them.

Figure 6 shows a portion of H-2412 at reduced scale in the area of the San Mateo bight. This Figure shows that by the date of the survey (1898), unmistakable signs of a major change in the mouth of San Mateo Slough had occurred. This change was specifically noted by the renowned geologist G.K. Gilbert (1917) in a U.S. Geological Survey professional paper dealing with the effects of hydraulic mining debris and other geologic processes upon California rivers and ports. According to Gilbert:

"It is true that the marsh edge (of San Francisco Bay) is not everywhere a well-defined and unmistakable line and that its mapping involves questions of interpretation (see Chapter IX), but as to the general fact of wave encroachment there can be no question, for the erosion of the marsh front has opened new outlets for marsh waters and thus caused new tide channels to be scoured out and old channels to be silted up. A conspicuous example of this is found in the history of San Mateo Slough. In 1858 the mouth of the slough was at a point about 1 mile west of Guano Island, and a bend of the slough approached the coast at a point three-quarters of a mile farther west. The bend was then separated from the open water by a strip of marsh 1,000 feet wide. By 1898 the coast had retreated so far that the slough communicated with the bay at the bend, and a new mouth had been established at that point, the old mouth having become so nearly obsolete as to carry no water at low stages of tide. Examples of

similar character are afforded by Mountain View Slough, Newark Slough and Guadalupe River, and a change in the mouth of Ravenswood Slough that had been barely initiated in 1898 was nearly complete when I visited the locality in 1914."

[(Gilbert (1917) p. 21; emphasis added)]

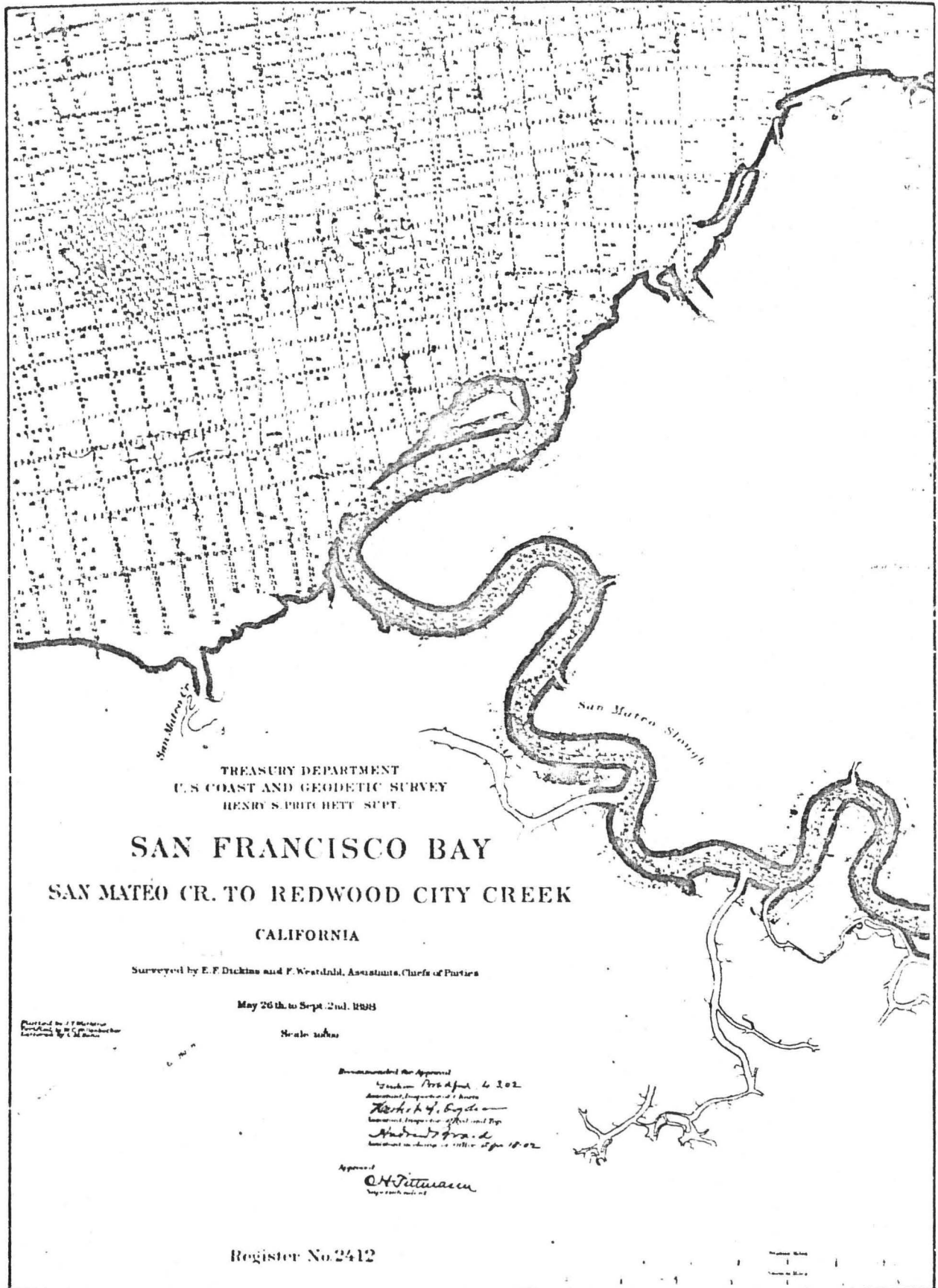


FIGURE 6. Portion of the hydrographic survey H-2412 conducted in 1898 by the U.S. Coast & Geodetic Survey. The diked parcel A is located around the marsh island at the mouth of San Mateo Slough.

The 1898 hydrographic surveys of south San Francisco Bay generally show a higher degree of hydrographic coverage than found in all prior work. Soundings were taken in high density generally along sets of parallel lines at right angles in which the distance between successive lines of soundings was generally about 500 feet, and furthermore, soundings were reported in great detail in the watercourses of tidal creeks. Many creeks that had never before been sounded for depths were covered during the work. In the shallow areas, soundings shown on the sheets were reported often to the nearest $\frac{1}{4}$ foot in depth.

H-2412 shows only a few topographic features such as triangulation points. In the water areas, however, dashed lines apparently show the boundaries of oyster beds. Such an oyster bed area appears immediately east of the diked parcel A, and lines of soundings are discontinuous at the edge of the bed. A line of dots appears in the water area a short distance northerly of the northern boundary of the diked parcel A; the dots probably represent the "line of stakes" noted on T-2310 (1897-98).

The creek labelled "San Mateo Cr." on H-2412 at its most westerly portion is actually the unnamed slough upon which Hayward's Landing was located according to the companion topographic sheet T-2310. For the sake of convenience, we shall refer to this unnamed slough as "Hayward's Landing Creek." The true location of San Mateo Creek is westerly of the area of coverage of H-2412.

The water depths shown on H-2412 immediately bayward of the above unnamed slough ("Hayward's Landing Creek") appear to be nearly uniform, with values in the range from -3 to -4 feet, (i.e., above datum). The channel at the mouth of this slough shown on H-628 (1857-58) leading to deeper waters no longer existed at the time of the 1898 hydrographic work. This channel is shown in Figures 1 and 4; soundings were taken in it on Jan. 12, 1858 giving depths as great as 5 feet below datum. It is reasonable to suggest that the

loss of this channel was the direct result of the loss of tidal prism in adjacent areas occasioned by the damming of Hayward's Landing Cr. and the diking of the surrounding marshlands, which is shown on T-2310 and described above.

It is unquestionable that H-2412 shows soundings within the area of diked parcel A. The presence of the soundings on the sheet indicates that a sounding vessel navigated the area in 1898.

c. Surveys of the 1930's.

Between 1929 and 1931, some eight topographic sheets covering most of south San Francisco Bay were prepared by the U.S. Coast & Geodetic Survey. Most of these (including T-4605 which shows the San Mateo bight) were based upon field work performed during 1930 and 1931.

Hydrographic work in south San Francisco Bay produced some six sheets from data obtained during 1931; one of these (H-5133) includes much of the San Mateo bight.

In addition, some nine other topographic sheets were prepared for south San Francisco Bay that were based upon aerial photographs taken in 1931 and 1932. These latter sheets are cited as "Planimetric Maps" by the U.S.C. & G.S. The sheet T-4642 of this series shows the San Mateo bight.

Substantial changes in the tidal regime for the Brewer Island-San Mateo bight area occurred between the time of the prior survey in 1897-98 and these 1930-31 surveys. Nearly the entire Brewer Island area was enclosed by dikes during this period, except that the main channels of San Mateo Slough and Angelo Slough were left open. Details of these changes are discussed below.

T-4605 (1930-31) "Pt. San Mateo to Marsh Pt.;
South San Francisco Bay; California".

As suggested above, nearly all of the former marshlands of Brewer Island and adjacent areas had been diked by the time of the surveys for this sheet. Brewer Island is designated as "grass" on the sheet, and several fences, dikes

and roads are shown in the area. Three lines of transmission line towers are shown crossing Brewer Island and extending along and across other baylands shown on the sheet. The extension of Third Avenue from San Mateo to the western pierhead of the San Mateo-Hayward Bridge is also shown. San Mateo Slough, O'Neill Slough and Angelo Slough are still shown as subject to tidal action - permitting tidal flow from the bight south of Pt. San Mateo to Belmont Slough some two miles to the Southeastward. However, none of the other tributaries to these major sloughs appear on the sheet.

Southwesterly of Brewer Island, the former marshlands that appeared in the 1897-98 topographic surveys have largely been converted to salt evaporating ponds. According to Ver Planck (1958);

"The Leslie Salt Refining Company, one of the first salt producers on the west side of San Francisco Bay, was established June 25, 1901. The principal plant was about a mile south of San Mateo in an area that following World War II has been filled in and covered with houses. A second plant near Redwood City was in operation in 1908 but was closed in 1909. A vacuum refinery began production at the San Mateo plant in 1910... Production at this time (1919) was about 25,000 tons per year, mostly refined salt, obtained from 1850 acres of marsh land."

(Ver Planck, 1958, p. 110).

The Descriptive Report for T-4605 notes some of the changes that had taken place and were underway at the time:

"Levees extend along or near the shore line converting former marsh to meadow lands. The sloughs have also been confined by levees and the reclaimed areas used as meadow lands or as evaporating ponds. The shore line of the latter is indicated by the inner edge of the confining levees. ...

"No oyster beds are now existant along the bay shore.

"Port San Francisco, plans of which are enclosed, is at present undeveloped. ... No work is being done at the present time.

"The main channel of Oneill Slough at it's junction with Belmont Slough is now what was formerly a small interconnecting channel between Oneill and Belmont Sloughs. The former channel has silted in so as to become impassable even for a small skiff."

The Descriptive Report contains two remarks concerning the elevations

of tidal marshlands in the area:

"A cliff of 50 ft. elevation at Pt. San Mateo falls away for about 450 meters to the southward where the coast land becomes marsh and lies at about mean high water. ... The area between Steinbergen and Redwood Sloughs, some of which was at one time reclaimed land, has again reverted to marsh due to the breaking and overflowing of the confining levees. The marshes lie about one foot below extreme high water. The area is traversed by numerous small sloughs."

The diked parcel A itself does not appear on the sheet to have been modified in any way by works of man. On this part of the sheet, map symbols show the existence of a levee along the north side of Third Avenue. To the north of the levee, map symbols for marshland appear in a shoreline fringe and a small island.

T-4642 (1931) "Pt. San Mateo to Steinbergen Slough;
San Francisco Bay; California."

The sheet T-4642 is based upon aerial photographs using a five lens camera in three different flights on the dates: April 29, 1931, May 7, 1931, and May 8, 1931. The sheet indicates that the April 29 flight photos were taken at 12:30 p.m., but the Descriptive Report for the sheet cites this time as 2:30 p.m. In addition, the Descriptive Report also refers to "T-4505" frequently, which most certainly should read T-4605 instead.

The most apparent difference between T-4605 and T-4642 is the high degree of detail presented in the case of the latter sheet. For example, many former tidal creeks within Brewer Island dikes and other former tidal marshland areas are shown on T-4642, which also shows much greater detail for dikes in evaporating ponds, city streets and structures. The plant of the "Leslie Salt Refining Co." is shown located along the Southern Pacific Railroad line as well. According to the Descriptive Report for T-4642, "dredging was in progress" for the Port San Francisco development (see, however, note to the contrary in the above remarks re T-4605).

No significant differences in topography or improvements appear on the sheets T-4605 and T-4642 in the immediate vicinity of diked parcel A. Thus the remarks given in the above summary for T-4605 suffice in this regard.

Some differences and difficulties in topographic control for the two surveys are noted in the Descriptive Reports, but are beyond the scope of this study.

Both of these topographic sheets show major changes in the width of Angelo Slough from that seen on the 1898 topographic sheet T-2310. The 1898 sheet shows Angelo Slough to vary in width from approximately 250 feet to over 400 feet wide. By contrast, the 1931 sheet T-4605 shows a minimum of approximately 60 feet and a maximum width at the mouth of about 250 feet, and T-4642 shows the slough nearly disappearing into the marshland at its narrowest point. Upon examination of the sheets T-433 and T-2310, it is seen that between 1853 and 1898, this and other major sloughs crossing the area of Brewer Island showed little change in width during the intervening 45 years. However, it was during the 33 years between 1898 and 1931 that the slough narrowed so markedly. Most of the diking of the marshlands adjacent to Angelo Slough was completed in the early 1900's, and significantly reduced the tidal prism for the area. Similar effects upon San Mateo Creek are discussed at page 23 (re Descriptive Report for T-2310) and at page 29 (re the unnamed slough between San Mateo Creek and San Mateo Slough). Changes in water depths for San Mateo Slough between 1898 and 1931 are discussed below.

H-5133 (1931) "San Mateo Slough to Westpoint
Slough, San Francisco Bay, California."

The sounding coverage for this 1931 sheet is not so complete as in the case of the 1898 hydrographic survey. In the shallow areas, soundings are reported to the nearest $\frac{1}{2}$ foot, although the Descriptive Report that "In the sloughs many of the fractions were left off the plotted depths." This Report noted that the work was carried out in "Chartered launches 6213 and B414", and water depths were determined "with the pole" in shallow areas and in crossing small sloughs. According to Reports for other hydrographic surveys of south San Francisco Bay taken in 1931, the deeper waters were measured using the lead line.

The Descriptive Report for the adjacent sheet H-5129 (1931) states that the reason for plotting soundings to the nearest $\frac{1}{2}$ foot is that "the U.S. Engineers are much interested in the silting that is taking place in San Francisco Bay." This Report also notes that "when sounding the flats emphasis was placed on securing accurate soundings rather than close development and a pole was used for those soundings wherever possible."

The Descriptive Report for another sheet in the 1931 series (H-5131) states that "the general agreement with the old surveys of 1857 and 1858 and of 1897, 8 and 9 is very good. Radical changes are noted in Redwood Creek Channel, which has been dredged by the U.S.E.D. to give a clearance of 20 feet. There has been considerable shoaling in Mt. Eden Slough, Alameda Creek and Coyote Hill Slough, but the Descriptive Report states that these are used only at high tide by boats of light draft."

Similar remarks appear in the Descriptive Report for H-5133, the sheet of interest here, viz., "a comparison with H-2412 (1898) reveals many changes in shoreline and much silting in the sloughs, some parts of the latter being entirely blocked to navigation at low water."

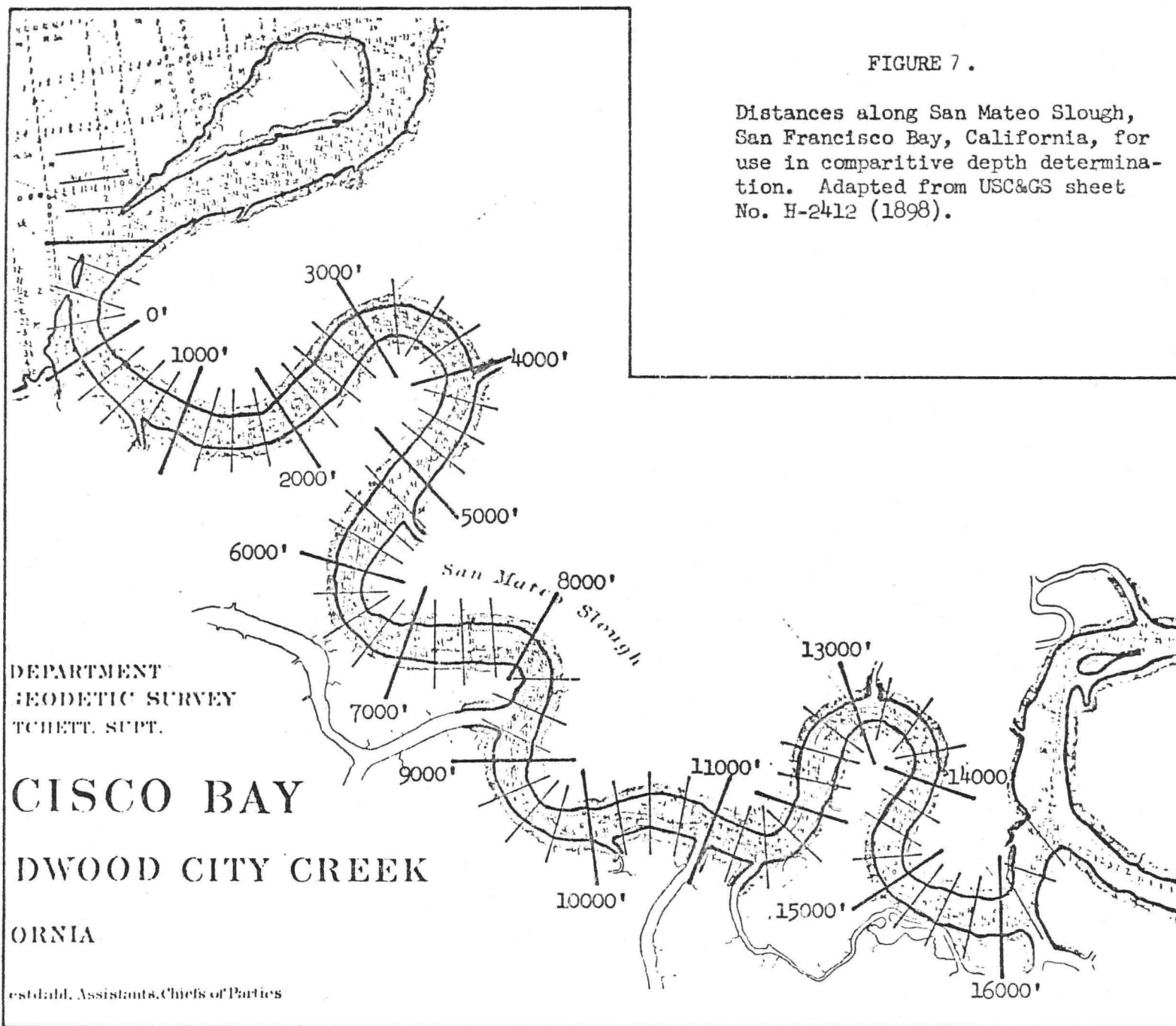
For the purpose of verifying the above remark in the area near the San Mateo bight, we have made a detailed comparison between the soundings reported in San Mateo Slough for both 1898 and 1931. Figure 7 shows a distance scale laid out on a portion of H-2412 (1898), and Figure 8 shows the comparative soundings for these two surveys as a function of this distance along the slough. This Figure shows that in 1898, the depth of the slough reached or exceeded 20 feet (below datum) at six points and had a maximum depth of 24 feet. By contrast, in 1931, the greatest depth seen was $12\frac{1}{2}$ feet. The deepest portions of tidal creeks usually occur at sharp radius bends or where tributaries join with the main trunk. Figure 8 shows that some 14 feet of sediments were deposited by 1931 in some of the former deep portions of San Mateo Slough. At the mouth of the slough, as much as 10 feet

of sediment was deposited between the two surveys.

Unfortunately, the 1955-56 hydrographic survey of the area does not show soundings in San Mateo Slough; hence, the comparison in depths can not be extended to this latter work.

FIGURE 7.

Distances along San Mateo Slough,
San Francisco Bay, California, for
use in comparative depth determina-
tion. Adapted from USC&GS sheet
No. H-2412 (1898).



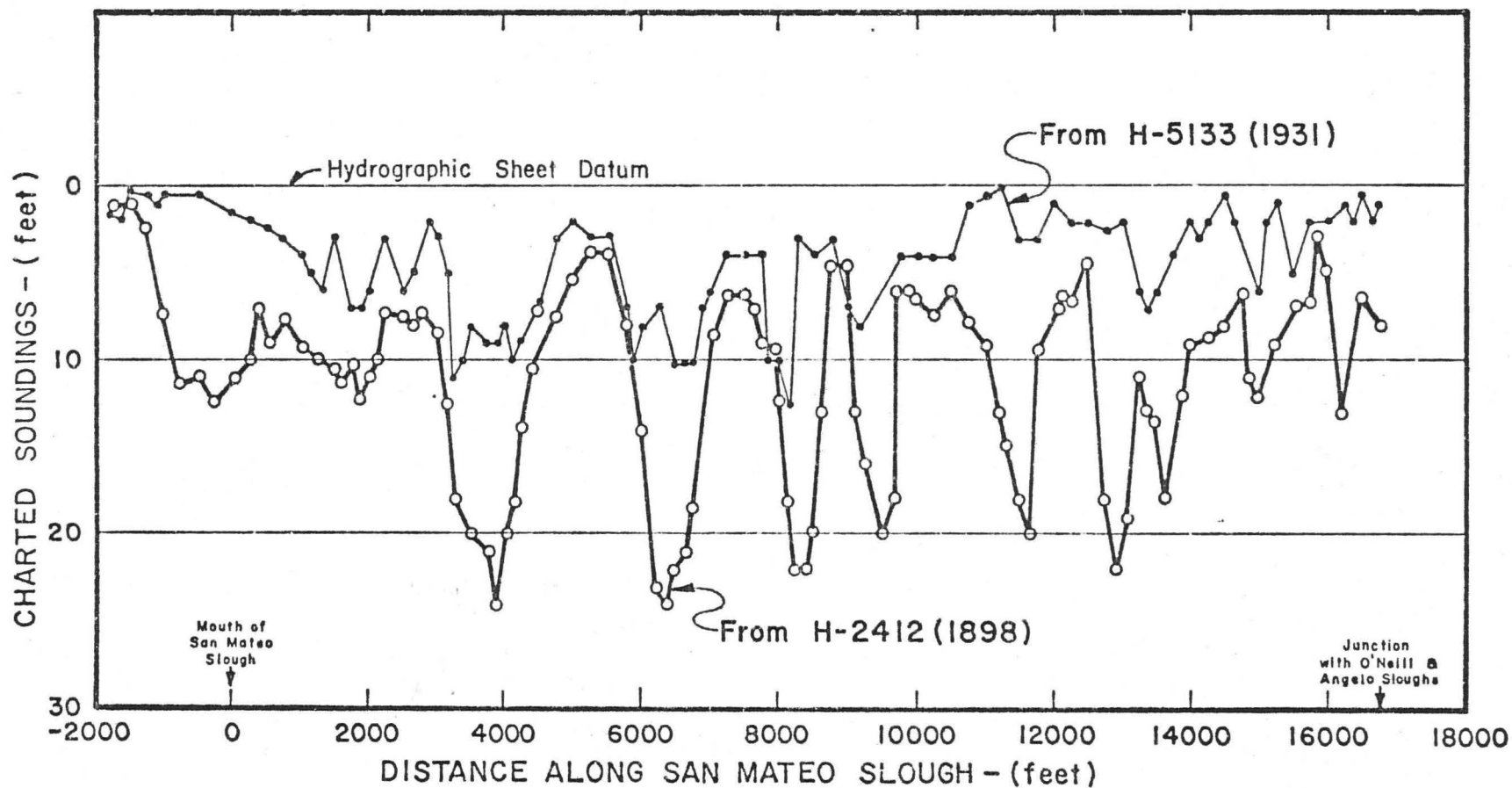


FIGURE 8. Comparison of water depths given on U.S.C.&G.S. hydrographic sheets H-2412 (1898) and H-5133 (1931) for San Mateo Slough, San Francisco Bay, Calif. from its mouth to the junction with Angelo and O'Neill Sloughs.

d. Surveys of the 1950's.

A series of some 13 topographic surveys for south San Francisco Bay was prepared during the early 1950's. These surveys have been designated as "Shoreline Manuscripts" by the U.S.C. & G.S., and were based upon the aerial photography of September 23, 1952 using a 9-lens camera. A single Descriptive Report treats T-11063 through T-11077. The San Mateo bight appears on T-11069.

During 1954-56, some 9 hydrographic surveys were prepared covering south San Francisco Bay. The San Mateo bight is shown on H-8026.

T-11069 (1952) "Point San Mateo to San Mateo Bridge, San Francisco Bay, California."

From material in the Descriptive Report, it appears that aerial photographs numbered 39212 and 39213 were used in preparation of T-11069. The Report noted that these photographs were taken between 12:21 and 12:31 p.m. on September 23, 1952. A note stated that "All flights are within 1.0[±] of Mean High Water for South San Francisco Bay."*

Some incidental remarks given in the Report are: "The former proposed port development between Belmont Slough and Steinberger Slough has been given over to salt ponds.", and "The oyster industry in the bay has yielded to oil pollution problems and there are no oyster houses remaining."

The Report notes:

"The mean high water line has been delineated throughout its length, except where it was quite obvious around piers, etc. The inspection in most details has been in compliance with paragraph 542 of the Topographic Manual. On the west side of the bay from San Francisco to the San Mateo Bridge, the inspectors inked the apparent shoreline in blue ink, but the practice was discontinued in other portions of the projects."

(Descr. Rpt. p. 18)

* Tide Table predictions using a computer program indicate that the tide level at San Mateo Bridge reached mean high water at approximately 12:31 p.m. on Sept. 23, 1952.

The applicable procedures given in paragraph 542 of the Topographic Manual are:

5421. Shoreline (Mean High-Water Line)

The line delineated on planimetric, shoreline, and topographic manuscripts as the shoreline approximates the mean high-water line (the line of intersection of the mean high-water plane with the ground). However, where there is marsh grass, mangrove, cypress, or other similar marine vegetation, the shoreline (mean high water) is often obscured and cannot be mapped. In these areas an apparent shoreline is mapped at the point where the line of vegetation is a definite line above mean high water. As this is the line that appears to the navigator as the shoreline, it is delineated as such and is located in lieu of actual mean high-water line. ...

[From Topographic Manual (1949),
Part II, Chap. 5., pp. 338-9]

The Report also provides a description of the foreshore:

"The foreshore is mostly mud all over the bay. The mean high water line is marked by a fairly well-defined berm, even where there is marsh inshore and the mean high water line gives way to apparent shoreline. This berm is a low bank, possible (sic) six inches above mean high water. There is an abrupt drop at the berm of about two feet to a mud bottom which extends seaward."

(Descr. Rpt. p. 19)

The Report warns however, that in this work, "There is in general no check furnished on the elevation" of features, and at another point we find the remark "vertical accuracy is not applicable".

In the area of the San Mateo bight, T-11069 shows little change from the condition of the area given on T-4642 (1931), except for the continued erosion of the marshland margin immediately north of Third Avenue. A marsh island shown offshore on the 1931 sheet had nearly vanished by 1952. The 1952 sheet also notes that a new electric transmission line was under construction during the survey that parallels Third Avenue in the vicinity. See Figure 9. H-8026 (1955-56) "San Francisco International Airport to San Mateo Bridge, San Francisco Bay, California."

According to the Descriptive Report, the work on this hydrographic sheet extended from January 14, 1955 to March 25, 1955, and from January 4, 1956 to January 27, 1956. The shoreline and topography was obtained from T-11066,

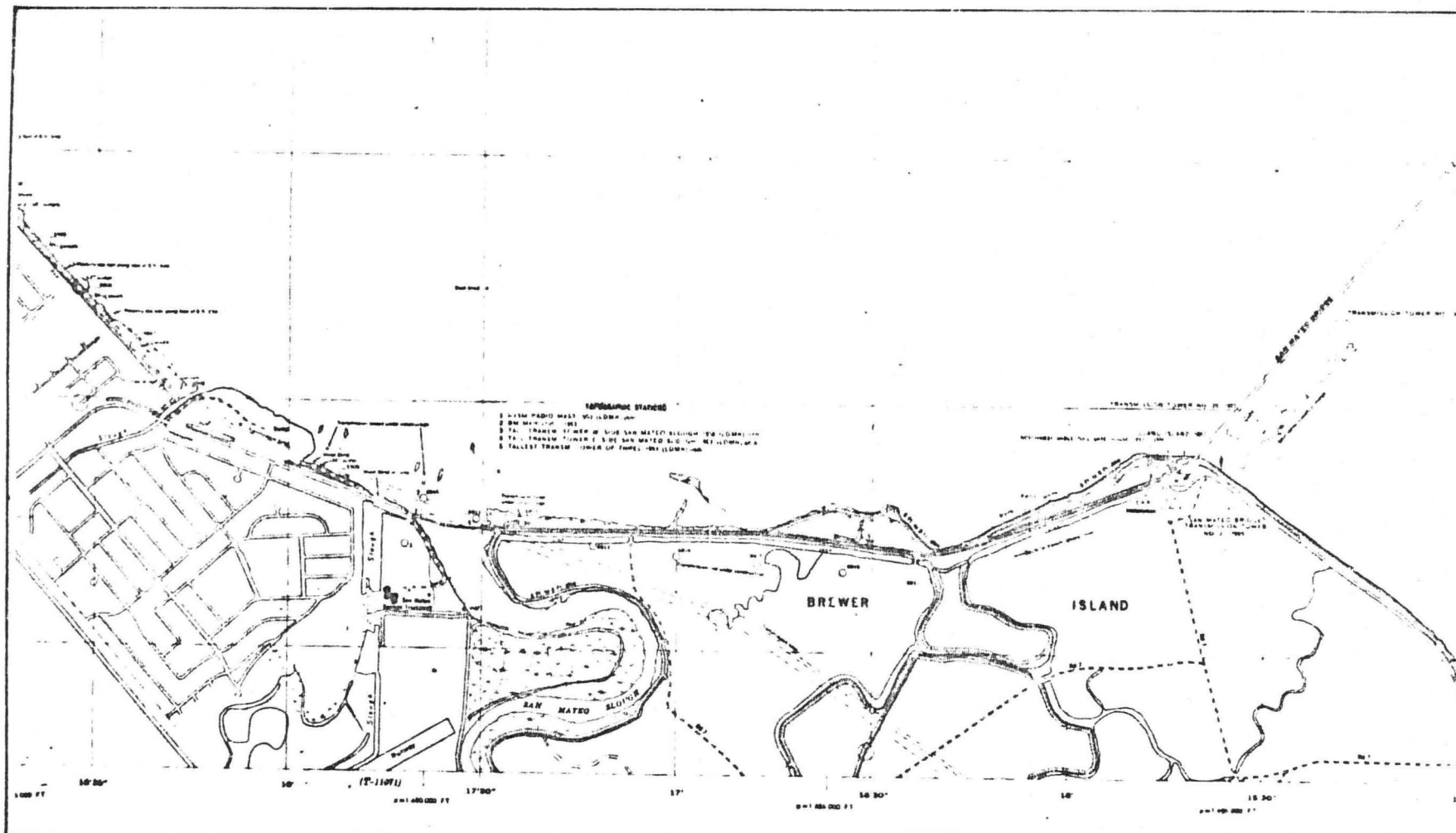


FIGURE 9 . Portion of the U.S. Coast & Geodetic Survey shoreline manuscript T-11069 (1952) "Point San Mateo to San Mateo Bridge." The diked parcel A is located immediately east of the mouth of San Mateo Slough.

T-11068 and T-11069 (1952-53). The Report noted that "Launch No. 123 was used for all the hydrography. A fish was mounted on the port side, and an 808 J type fathometer was used for all but the few soundings that were taken with a handlead and pole." Elsewhere, the Report noted that "Launch CS-160 was used during the month of January 1956." The tide reducers were based upon the tide gauges in operation at Point San Bruno and at the San Mateo-Hayward Bridge, and "for fixing the positions of the launch sextant angles were used throughout."

In the review section of the Report, it is stated "A comparison of the 1931 surveys and the present survey reveals generally only minor bottom changes of 1-2 ft., the present survey depths being slightly shoaler than the prior depths."

In relation to the San Mateo bight, it is of interest to reproduce a paragraph of the Report in the section "DANGERS AND SHOALS", namely:

"Duck blinds as dangers to small craft was mentioned in the previous descriptive report of this sheet. There are a number of others in various states of repair west of station "Sak". The hydro signals in a curved line from "Sak" to Point San Mateo are all duck blinds and are the furthest offshore of those in the area. Others, inshore are under construction and some are abandoned and rotting down. The stub piles are sometimes above or below surface of water."

Figure 10 shows a portion of H-8026 in the area of the San Mateo bight reduced to scale 1:24,000. This figure shows the duck blinds noted above. For the area of the diked parcel A, these duck blinds can be seen more clearly in Figure 11. Figure 12 is an overlay of H-8026 and the U.S.G.S San Mateo quadrangle map; from this figure it is seen that many soundings and one duck blind appear to be within the diked area of the parcel A.

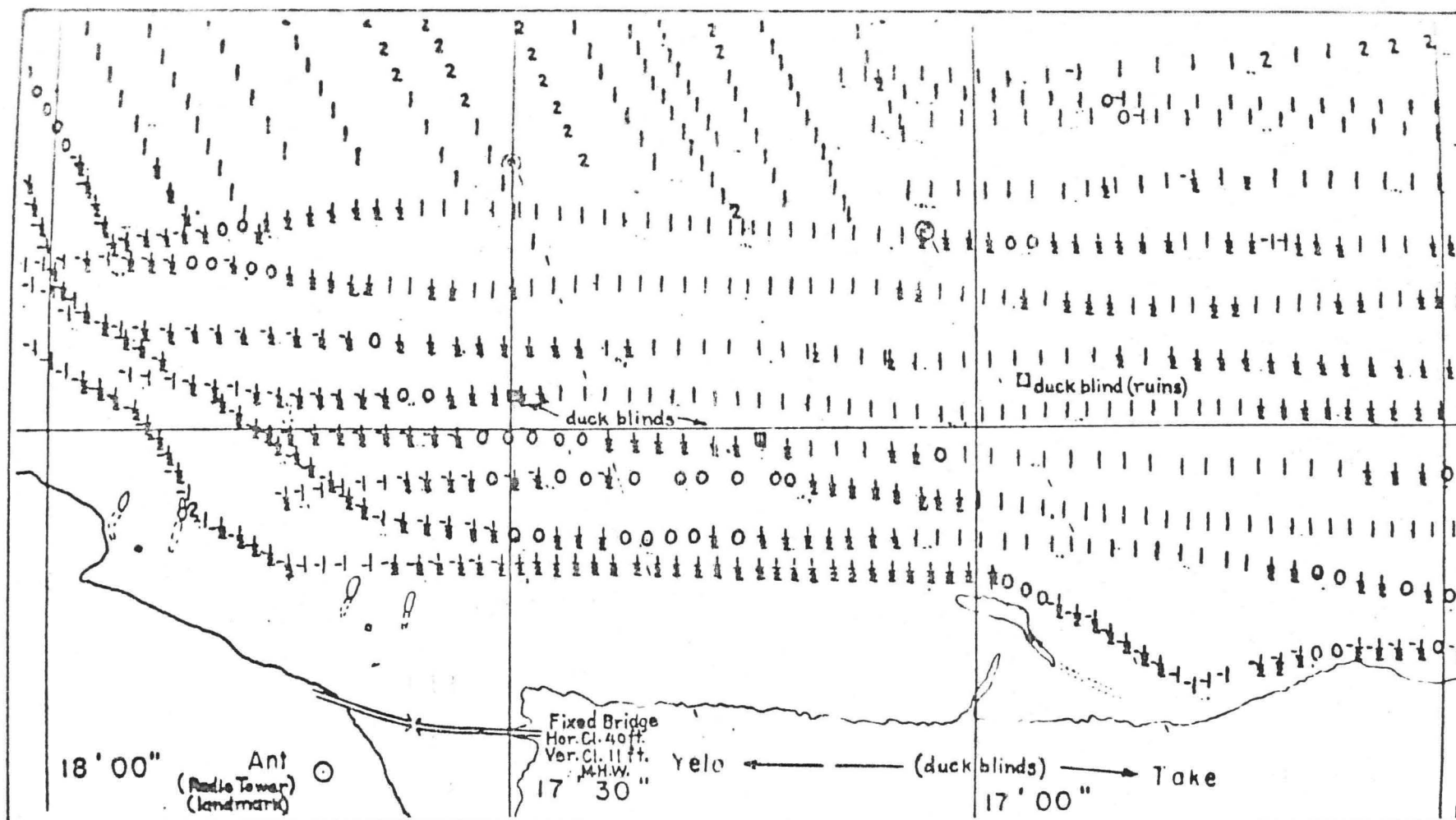


FIGURE 11. Portion of hydrographic sheet H-8026 (1955-56) in area of the diked parcel A at original map scale of 1:10,000 showing duck blind and soundings details.

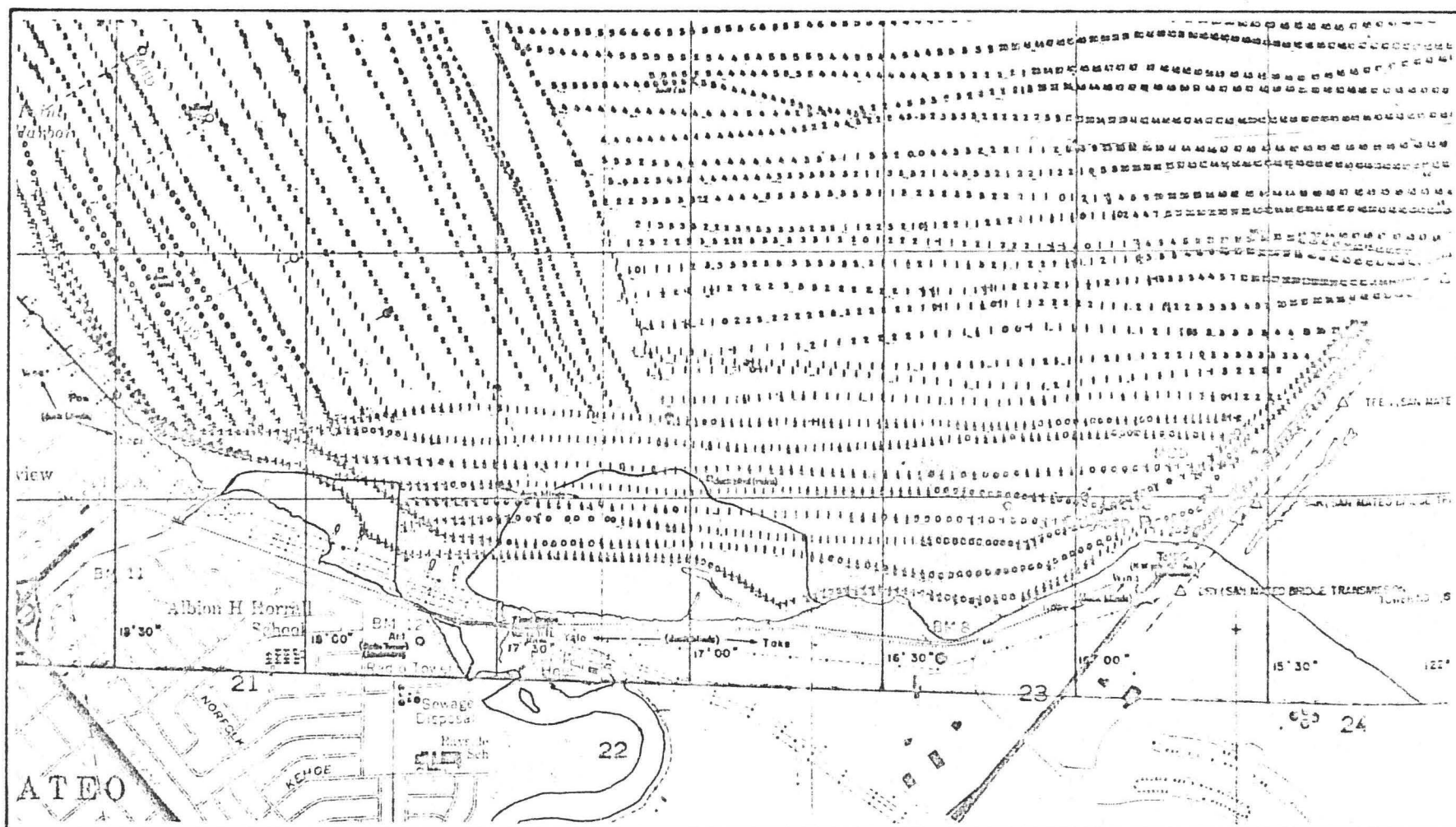


FIGURE 12. Overlay of hydrographic sheet H-8026 (1955-56) and U.S.G.S. quad-range map "San Mateo" at scale 1:24,000. Note thin solid line denoting diked area of diked parcel A. Many soundings and one duck blind are shown within the diked area.

4. Corps of Engineers permits under
the 1899 Rivers and Harbors Act.

Corps of Engineers permits issued prior to 1973 under the 1899 Rivers and Harbors Act for work in south San Francisco Bay are shown on a map entitled: "Demonstration Sketch No. 18B", prepared by the State Lands Commission and dated October 11, 1973. A portion of this map in the area of the San Mateo bight is reproduced here as Figure 13. The only permit for work within the diked parcel A was issued to the Estero Municipal Improvement District on January 3, 1961.

This permit authorized the Estero District to "dredge and fill" a large area of existing and former tidal areas "for the reclamation of Brewer Island, and to dispose of waste material from said island on tidelands between Steinberger and Belmont Sloughs" in accordance with three maps attached to the permit. The first of these maps is reproduced here as Figure 14, and shows that the diked parcel A is denoted as "area to be filled", with a "new dike" surrounding the property. This permit was issued under Section 10 of the 1899 Act, but since the work included the "new dike", it can be argued that this work would have been more appropriately authorized under Section 9 of the 1899 Act.

The history of the 1961 permit and several others in the Foster City area is given on pages 168-174 in the record of hearings held by the House Conservation, Energy and Natural Resources Subcommittee in Foster City on September 12-13, 1975. For the sake of completeness, this history is reproduced below.

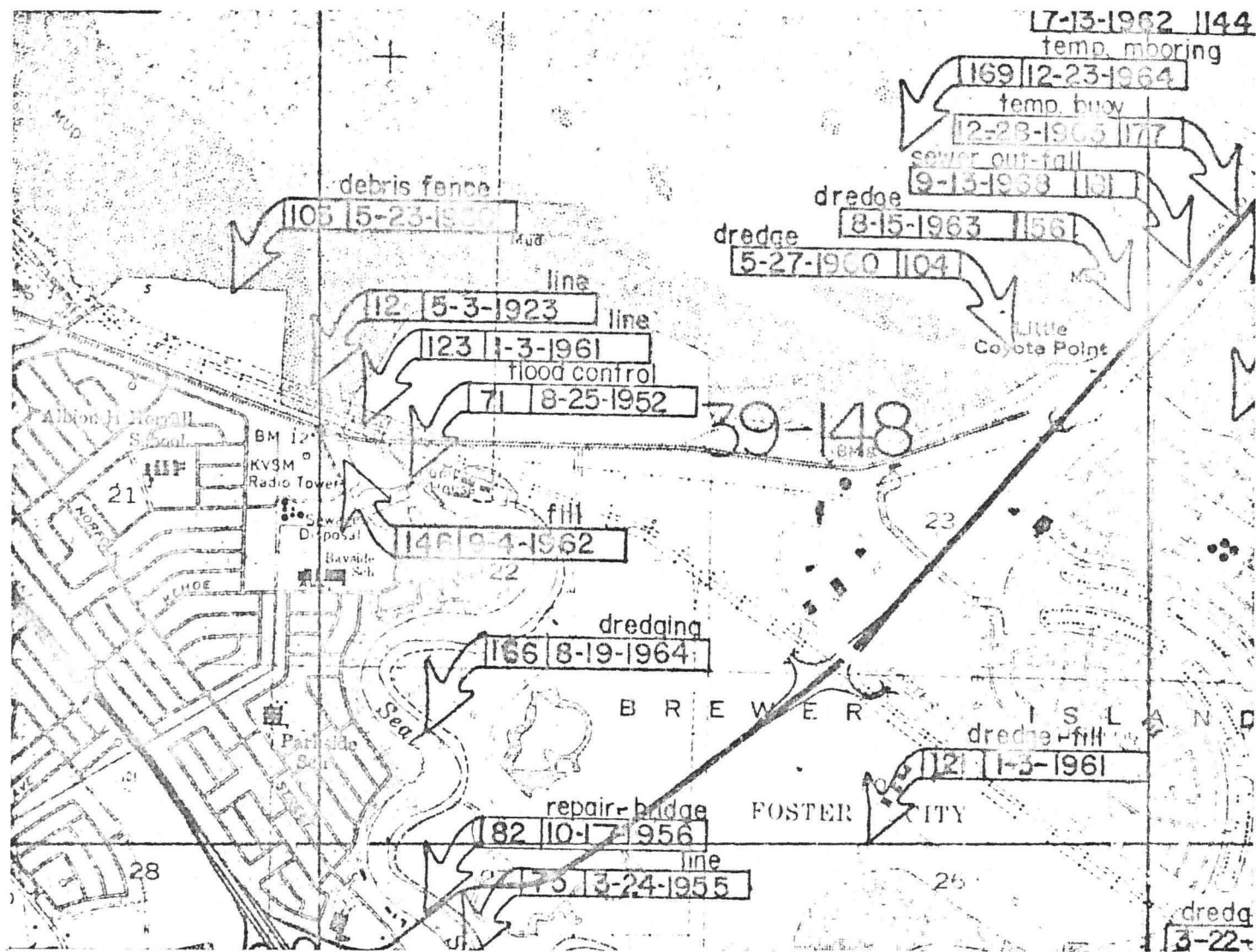
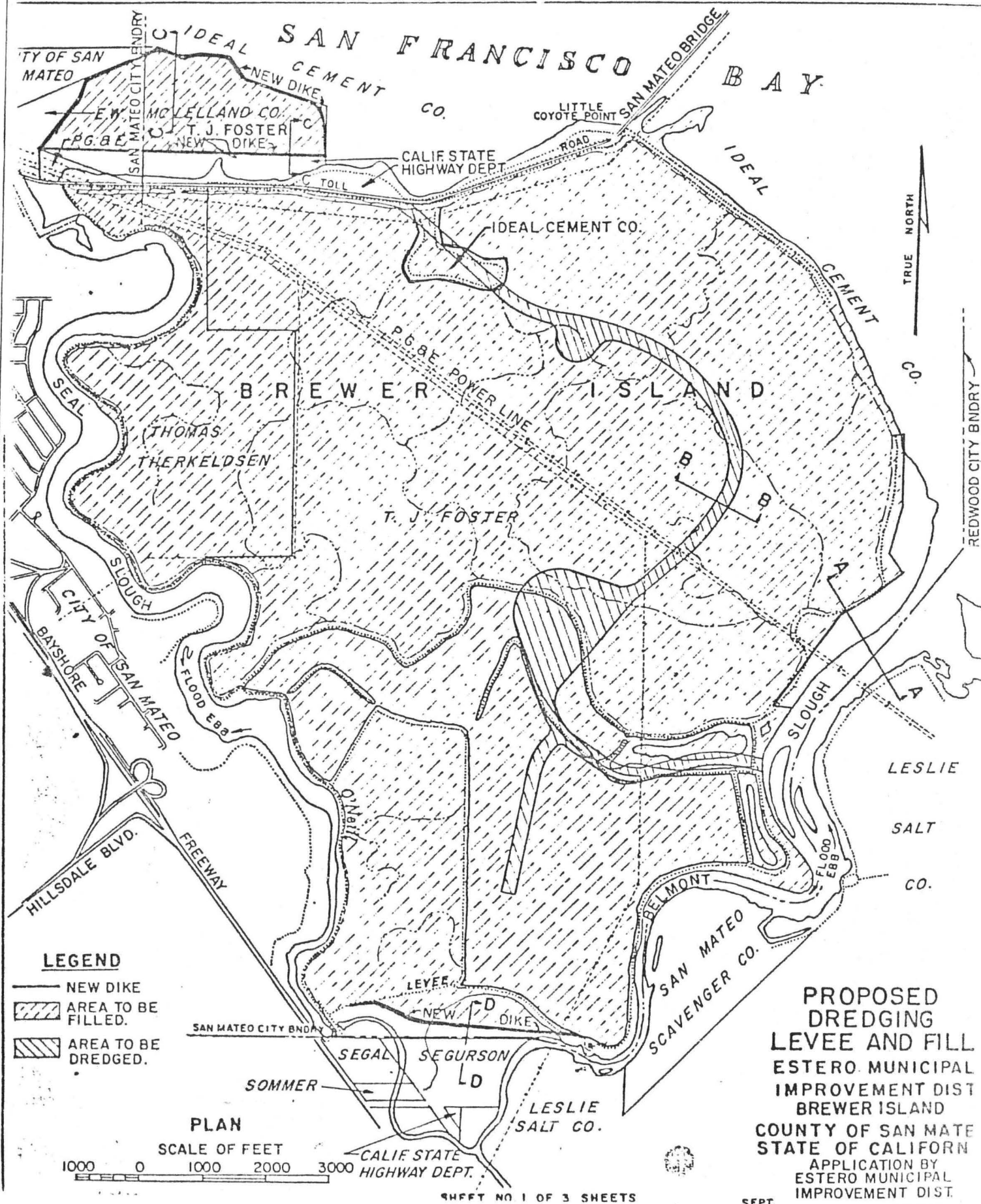


FIGURE 13. Portion of State Lands Commission Demonstration Sketch No. 18B (1973) showing permits issued by the U.S. Army Corps of Engineers in the area of the San Mateo bight. Figures show date of permit, purpose, and file number.

FIGURE 14. Copy of map included in the 1961 Corps of Engineers permit issued to Estero Municipal Improvement District under PN 61-31. Note "new dike" surrounds the diked parcel A, and that it is shown as an "area to be filled".



Excerpts from the printed hearings record:

"Roles of the Corps of Engineers and U.S. Fish and Wildlife Service in Foster City, Calif." Hearings before the Conservation, Energy, and Natural Resources Subcommittee; Comm. on Govt. Operations; U.S. House of Representatives. September 12-13, 1975. Written testimony by Loma Prieta Chapter, Sierra Club.

APPENDIX

CHRONOLOGICAL INVENTORY OF CORPS PERMITS IN FOSTER CITY AND REDWOOD PENINSULA

The following is a chronological history of permits issued by the U.S. Army Corps of Engineers for work in Foster City and Redwood Peninsula.

FOSTER CITY

December 28, 1925

The earliest permit known for work on Brewer Island. Issued to Leslie Salt Refining Company for two dams across the extremities of Angelo Slough under Section 9 of the River and Harbor Act of 1899; permit expired on Dec. 31, 1928.

U.S. Coast and Geodetic Survey (USC&GS) hydrographic survey of 1898 shows Angelo Slough to be between 250 to 400 feet wide and as deep as 6½ feet at Mean Lower Low Water (MLLW).

All evidence indicates these dams were never built under this permit authority. Fairchild aerial photographs of 1929 show no dams on Angelo Slough. USC&GS hydrographic survey of 1931 (II-5133) shows no dams and shows continuous soundings within the area that was to have been dammed. However, 1946 U.S. Geological Survey aerial photographs shows two dams across Angelo Slough not in the locations authorized in the 1925 Corps permit. In the Corps permit, one dam was to have been located at the junction of Angelo Slough with Belmont Slough; the 1946 photographs show this dam constructed about one-half mile westerly of this junction. Leslie Salt Company surmises these two dams were constructed in 1941 or earlier—after the expiration of the Corps permit.

1952

Leslie Salt Company constructs major dams across Angelo Slough. No Corps permit.

January 12, 1954

Protest against the dams filed with the Corps by David R. Sears, M.D., other individuals, organizations, and the Belmont City Council. Dr. Sears stated that as a result of the damming of Angelo Slough: "Within six months to one year of the time the dam was built the (boat) channel (in Belmont Slough) disappeared completely."

November 24, 1954

Leslie Salt Company applied for a Corps permit for the existing dams.

March 21, 1955

The Chief of Engineers refused the granting of a permit under Section 9 of the River & Harbor Act of 1899. He also stated that no action was contemplated to order the dams removed.

August 31, 1959—State Lands Division Permit—PN 60-21

The California State Lands Division applied to Corps for a permit to dredge material at San Bruno Shoal—an area north of the San Mateo-Hayward Bridge and located to the east of the main shipping channel of South San Francisco Bay.

The application states: "Dredged material will be used in the development of tidelands in San Mateo County. The area in which dredging operations are proposed to be conducted is not within the corporate limits of a municipality. The area will be offered for lease pursuant to competitive bidding and a lease issued to the highest qualified bidder."

September 3, 1959

Letter from Corps to State Lands Division requesting clarification.

September 15, 1959

Letter from State Lands Division to Corps answering: "Approximately 22,000,000 cubic yards of material would be removed by dredging to maximum depths of between elevation -30 to -50 (MLLW). The material to be obtained will be used as fill soil in the development of tidelands in San Mateo County. . . . That portion of the mud overburden material, which is not used for fill in the contemplated development, will be redeposited in the borrow area."

September 18, 1959

Corps issued Public Notice 60-21 for dredging work as requested by the State Lands Division. Objections to be filed with Corps within 30 days.

October 20, 1959

Corps issued permit under Section 10 of the River and Harbor Act of 1899 to the California State Lands Division for dredging work described in PN 60-21. Permit expires on Dec. 31, 1962.

October 21, 1959

The San Mateo County Planning Commission requests of the Corps "a 90 day delay in the consideration of issuing a permit to dredge approximately 22,000,000 cubic yards of material from San Bruno Shoal." The Planning Commission makes the same request in a letter to the State Lands Division, stating that "there was not sufficient information in hand at this time to properly evaluate the scope of this vast project."

The letters noted, the San Mateo County Board of Supervisors also concurred in requesting the delay.

October 27, 1959

Letter from Corps to San Mateo County Planning Commission stating the permit was filed before the request for a 90 day delay was received. The Corps also stated: "In the event it is proposed to utilize this (dredged) material for the reclamation of San Mateo County tidelands the developer will be required to obtain an additional permit from the Department of the Army."

Two extensions to this permit were later issued and are described in PN 62-100 dated Jun 27, 1962 and PN 68-13 dated Oct 2, 1967.

September 23, 1960

Main Foster City Permit—PN 61-31 Wilsey, Ham & Blair, Engineers and Planners, Millbrae, Calif., in behalf of Estero Municipal Improvement District (Foster City), applied for a Corps permit stating in their letter of application. "The work is necessary to accomplish the reclamation of the property known as Brewer Island. . . . The work consists of construction of new levees, placing of approximately twenty million cubic yards of sandfill on Brewer Island. . . . Waste mud from dredging operations may be deposited within a disposal area located immediately southeast of Brewer Island."

October 4, 1960

Corps issued PN 61-31 for work described by Wilsey, Ham & Blair. The Public Notice also stated "the sandfill is to be obtained from San Bruno Shoal, San Francisco Bay, California, as described in our Public Notice No. 60-21 dated 18 September 1959." Objections to be filed with the Corps within 30 days.

October 14, 1960

Letter to Corps from F. J. Horig, Executive Officer of the State Lands Division stating: "The State Lands Division interposes no objection to the application . . . as outlined in the subject Public Notice." There is no mention of official action by the California State Lands Commission with respect to this permit application.

November 9, 1960

Letter from California Division of Highways to Corps registering "no objection" provided work does not encroach on highway right-of-way and drainage is not impaired.

November 18, 1960

Letter to Corps from George C. Shannon, District Manager, Estero Municipal Improvement District, requesting the permit be issued for six years rather than the usual three years.

The letter states: "Additional site preparation and preliminary work will involve a massive land leveling operation over the entire development area, filling of existing major sloughs and channels with excavated mud from the proposed interior lagoon (approximately 1.5 million cubic yards)." After stating that 20,000,000 cubic yards of sand from San Bruno Shoal would be the fill source, EMID's letter continues that there is "approximately the same amount of mud overburden in the borrow area which must be disposed of. . . ."

It is our understanding that this 20,000,000 cubic yards of mud overburden was pumped into San Francisco Bay causing sediment problems throughout South San Francisco Bay.

December 2, 1960

Report by District Engineer to Division Engineer stating: "It is recommended that the District Engineer be authorized to issue the permit for a construction period of 6 years."

Inclosures to this report show no report on the project from the California Department of Fish & Game.

December 7, 1960

Letter from U.S. Bureau of Sport Fisheries & Wildlife to Corps stating "no objection" to granting this permit. The Bureau stated further that the project "has been thoroughly explored and discussed" with the California Department of Fish & Game.

December 23, 1960

Division Engineer authorizes six year construction period for the permit described in PN 61-31.

January 3, 1961

Corps permit issued for work described in PN 61-31 under Section 10 of the River and Harbor Act of 1899 to "dredge and fill in the southerly arm of San Francisco Bay adjoining the City of San Mateo, California, for the reclamation of Brewer Island, and to dispose of waste material removed from said island on tidelands between Steinberger and Belmont Sloughs." The permit continues: "That if the structure or work herein authorized is not completed on or before the thirty-first (31st) day of December, 1967, this permit, if not previously revoked or specifically extended, shall cease and be null and void."

Drawings attached to the permit show the notation "New Dike" in an area of open water of San Francisco Bay at the northerly side of Brewer Island. "New Dike" also appears in part of the area near Belmont Slough. These drawings also show the waste material disposal area between Steinberger and Belmont Sloughs to be Redwood Peninsula which is now part of the Redwood Shores development.

Not included in the disposal area is the land parcel surrounding the last and remaining bed of Phelps Slough where Redwood City wished to construct a water reservoir and Mobil Oil Estates, Ltd. (the successor to Leslie Properties, Inc.) wishes to build a regional shopping center.

September 11, 1961—Belmont Slough Dredging—PN 62-34 & 62-34A

Estero Municipal Improvement District (Foster City) requested a Corps permit "to excavate and increase the depth of water, for navigation purposes, within the confines of Belmont Slough and extending Eastward to connect with the existing deep water channel in San Francisco Bay;" adding, "we will dispose of the silty mud material on adjoining lands."

October 2, 1961

Corps issued PN 62-34 for the project, stating that "all of the dredged material, amounting to approximately 2,500,000 cubic yards, would be placed behind a leveed area located between Belmont Slough and Steinberger Slough."

It should be noted, this area described in the Public Notice is the present Redwood Shores development on Redwood Peninsula.

October 25, 1961

Letter to Corps from F. J. Horig, Executive Officer of State Lands Division stating: "The State Lands Division interposes no objection" to issuance of the permit regarding work described in PN 62-34.

As in a similar letter regarding PN 61-31, this letter makes no mention of any official action by the State Lands Commission itself with respect to this request.

October 31, 1961

Corps issued PN 62-34A: this Public Notice supercedes PN 62-34. The only difference being in regard to details of the turning basin and dry dock on Foster City's bayfront near the mouth of Belmont Slough.

December 21, 1961

Corps permit under Section 10 of the River and Harbor Act of 1899 issued to Estero Municipal Improvement District (Foster City) for work described in PN 62-34A. This is a six year permit set to expire on Dec. 31, 1967.

December 21, 1961—Levee Construction on Brewer Island—PN 62-58

Corps Public Notice No. 62-58 issued regarding request of Estero Municipal Improvement District (Foster City) for a permit "for two disposal areas" on the shore of Brewer Island. "Levees would be constructed . . . to contain some of the material to be dredged from South San Francisco Bay and Belmont Slough under a previous authorization."

January 9, 1962

Corps permit under Section 10 of River and Harbor Act of 1899 issued to Estero Municipal Improvement District "to construct levees to an elevation of 12± feet above MLLW so as to form disposal areas in South San Francisco Bay and Belmont Slough." Expiration date of permit is Dec. 31, 1965.

Both areas affected by the Corps permit appear relatively small as shown in the permit. One area lies along the north bank toward the mouth of Belmont Slough; the other area is located along the northeasterly shore of Brewer Island just south of the San Mateo-Hayward Bridge.

January 17, 1963—Dredge Spoils Permit—PN 63-30

Corps Public Notice No. 63-30 issued regarding application of Estero Municipal Improvement District to "place approximately 25,000 cubic yards of dredged

material adjacent to the westerly side of the entrance channel to Belmont Slough," an area lying in open waters of South San Francisco Bay.

January 29, 1963

Corps permit under Section 10 of the River and Harbor Act of 1869 issued to Estero Municipal Improvement District (Foster City) for work described in PN 62-30. Permit expires on Dec. 31, 1966.

June 27, 1962—Requests for Extensions of Time on Corps Permits

Corps PN 62-100 issued for extension of time on the California State Lands Division's permit issued on Oct. 20, 1959 which was due to expire on Dec. 31, 1962.

The original permit allowed the removal of 22,000,000 cubic yards of material from San Bruno Shoal in San Francisco Bay for use in the development of tidelands in San Mateo County. This work was originally described in PN 60-21 issued on Sep. 18, 1959.

The letter of application from the State Lands Division and the Corps permit issued for work described in PN 62-100 were missing from the Corps files.

August 14, 1967

Letter from Corps to Estero Municipal Improvement District (Foster City) advising EMID that the permit issued for work described in PN 61-31 "will expire on December 31, 1967 and that applications for extension of time should be submitted in the near future if any work waterward of the mean higher high water line is projected beyond that date."

PN 61-31 issued October 4, 1960 requested authorization from the Corps to construct new levees and to place 20,000,000 cubic yards of fill on Brewer Island behind these levees.

August 23, 1967

Letter from Estero Municipal Improvement District to Corps requesting a two year extension of their fill permit.

September 18, 1967

Letter from California State Lands Division to Corps requesting a further extension of time on their dredging permit. (See PN 62-100 issued on June 27, 1962 and PN 60-21 issued September 18, 1959).

The State Lands Division letter states that the dredging permit "applies to State Lease for Mineral Extraction P.R.C. 2613.1. issued July 28, 1960, expiring July 27, 1980. . . . Although approximately 13,000,000 of the estimated 22,000,000 cubic yards of material required for completion of the project have been extracted, the lease does not provide for a maximum of material which may be extracted."

October 2, 1967

Corps PN 68-13 issued requesting an extension of time on the dredging permit issued to the State Lands Division for 22,000,000 cubic yards of materials.

The Public Notice states: "Approximately 13,000,000 cubic yards of material have been extracted to date under the authorization. This material has been used for the reclamation of Brewer Island located at the westerly end of the San Mateo-Hayward Bridge. Of the remaining 9,000,000 cubic yards authorized to be dredged, it is estimated that only about 3,000,000 cubic yards will actually be required to complete the reclamation project."

November 3, 1967

Letter from California Resources Agency to Corps stating that State agencies find no objections to the issuance of an extension of time for the State Lands Division permit and requesting approval of the extension.

November 9, 1967

Letter from U.S. Federal Water Pollution Control Administration to Corps recommending that the dredging work should meet "all requirements set for this project by the San Francisco Bay Regional Water Quality Control Board." The FWPCA also recommended that the dredging work be conducted to minimize the effects "on water clarity, smothering of adjacent bottom areas, dissolved oxygen concentrations, and muddying of adjacent shorelines."

December 8, 1967

Corps issued extension of time on dredging permit to State Lands Division, adding the conditions recommended by the U.S. Federal Water Pollution Control

Administration in their letter of November 9, 1967. The permit expires on December 31, 1970.

December 8, 1967

Letter to Corps from Estero Municipal Improvement District (Foster City) cancelling their request for an extension of time for work described under PN 61-31 (Oct. 4, 1960) and PN 62-34A (Oct. 31, 1961).

EMID's letter states: "While there remains some interior work yet to be accomplished, it is our understanding that the completed perimeter levee system has removed the interior area from your jurisdiction and that an extension of the time limits of the permits is not required." The letter states that material from San Bruno Shoal will be used to complete the fill and that "this work will be accomplished under the authorization granted the State Lands Division as outlined in your Public Notice No. 68-13 dated October 2, 1967." The letter concludes that the Corps "kindly consider this letter as a report of completion of work under the permits."

May 17, 1968

Marginal note in Corps files by J. G. Collins stating: "All dredging suspended spring of 1968. All additional fill to be accomplished using imported dry materials."

August 27, 1973

Corps issued PN-74-0-22 requesting permission by the Estero Municipal Improvement District (Foster City) to place approximately 2,470,000 cubic yards of fill on 382 acres of land lying below the plane of MHHW. Source of material unknown.

This permit application is the subject of the present Subcommittee hearings.

REDWOOD PENINSULA

June 16, 1905

Corps permit granted to H. M. Pearsall and S. I. Allard for two dams; one dam was to be located across Phelps Slough at its junction with Steinberger Slough.

In 1907, a Corps inspector reported to his superiors that "the northerly one of these two dams was found to be completed" and to be "about 400 feet in length." The inspector reported that "the southerly one of these two dams, if it was ever built, has entirely disappeared" and that an investigation revealed that "certain parties led by ex-Governor Budd in person made protest and subsequently caused the dam to be blown out and the channel to be reestablished in its original condition."

The inspector also reported: "At the present time there is a schooner-landing on Phelps Slough some half a mile landward from the dam-site for which the permit was granted." An 1873 map of the region adjacent to the Bay of San Francisco prepared by the State Geological Survey of California, shows a landing named "Phelps' Landing" on the course of Phelps Slough.

U.S. Coast and Geodetic Survey (USC&GS) topographic survey of 1931 (#T-4605), USC&GS hydrographic survey of 1931 (#H-5133), USC&GS Shoreline Manuscript of 1952 (#T-11072), and U.S. Geological Survey aerial photographs of 1946 show no dam at the junction of Phelps Slough with Steinberger Slough. At some unknown date subsequently, a dam was constructed at the mouth of Phelps Slough, apparently without a Corps permit.

March 22, 1967

A Corps permit was issued to Redwood City General Improvement District 1-64 under Section 10 of the River and Harbor Act of 1899 "to dredge a channel approximately 8800 feet in length, 80 feet wide, and 8 feet deep at MLLW, the dredged material, approximately 400,000 cubic yards, to be used for levee improvements and/or placed shoreward of the levee, in Belmont Slough at Redwood City, San Mateo County, California."

The drawing attached to the permit shows the boundary of the dredge disposal area to be the bulk of Redwood Peninsula. The permit expired on Dec. 31, 1970.

Excluded from the permit authorization is the Phelps Slough area where Redwood City wished to construct a water reservoir tank and Mobil Oil Estates, Ltd., wishes to construct a regional shopping center.

July 5, 1974

Corps issued Public Notice No. 75-108-001 regarding application by City of

Redwood City to construct a "3.2 million gallon steel water reservoir and for the associated earthworks, including approximately 5,000 cubic yards of imported fill for a proposed landscaped peripheral berm." The Public Notice noted several other sites were considered for the construction of this water tank; locations of these other sites were not included in the notice.

The site selected was a pickleweed marsh area adjacent to the former mouth of Phelps Slough at its junction with Steinberger Slough.

This permit application was subsequently denied by the Corps and the water tank is under construction at an alternate site.

March 21, 1975

Corps issued Public Notice No. 10354-49 on application of Mobil Oil Estates, Ltd., "to fill and do storm drainage improvement at an approximate 210-acre area between the north side of Steinberger Slough and the existing Redwood Shores interior waterway and to improve an existing dike along Steinberger Slough. . . . Within the project area the former bed of Phelps Slough comprises 32 acres." The notice continues: "The purpose of the fill is the development of a regional shopping center and/or other commercial land use. Approximately 925,000 cubic yards of dry earth from construction sites (as yet unidentified) . . . will be required."

The notice also states: "In the 1950's, Phelps Slough was diked off and a tide gate installed for drainage." However, we could not find a permit in the Corps files authorizing the "diking" of Phelps Slough during the 1950's.

The permit application is still pending subject to EIS review.

April 22, 1975

Public Notice No. 75-251-067 issued by Corps on application of Jenks and Adamson, Consulting Sanitary and Civil Engineers, Palo Alto, California, acting as agent for the Strategic Consolidation Sewerage Plan Authority (SCSP), San Carlos, Calif., to construct a 22,000,000 gallons per day wastewater treatment plant in the Redwood Shores area of Redwood City, San Francisco Bay, San Mateo County, California. The Public Notice states: "Sewage will receive secondary treatment (activated sludge process) at the plant before being discharged to San Francisco Bay . . .".

Attached drawings to the Public Notice show the plant site to be located at the northeasterly corner of Redwood Peninsula adjacent to San Francisco Bay and the mouth of Steinberger Slough.

This permit application is the subject of the present Subcommittee hearings.

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Descriptive Reports for the following surveys conducted by the U.S. Coast Survey and its successor, the U.S. Coast & Geodetic Survey: H-628 (1857-58), T-2310 (1897-98), T-2258 (1896), T-2311, T-4605 (1930-31), T-4642 (1931-32), H-5131 (1931), H-5133 (1931), T-11069 (1952), H-8026 (1954-56).

U.S. Coast Survey sounding notebooks for H-628 (1857-58).

Department of the Army, Corps of Engineers, San Francisco District. Files relating to permits issued under the 1899 Rivers and Harbors Act.

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